

Editorial Notes.

THE course adopted by the United Society of Chemists and Druggists with regard to the Amended Pharmacy Bill seems to us to be just and politic. The Bill offers the public security, and the whole body of chemists and druggists proper recognition, while it provides that this body shall be reinforced in future by duly qualified persons. Its aim and scope are consistent with the requirements of all who practise pharmacy, and with the objects for which the Pharmaceutical and United Societies were founded. It may need further revision, but it is undoubtedly a fair and liberal measure in the main, and it would be unwise to delay its introduction into Parliament. A measure that no one could find fault with is unattainable, and delay is proverbially dangerous. According to the President's letter, the resolution unanimously adopted by a crowded meeting of the United Society on the 5th inst. was to this effect—"That this Bill be accepted as a basis for legislation, and that in case of any difference of opinion arising between the two Executives, this meeting hereby determines to refer the same to the impartial decision of Parliament." By this resolution the united action of the two Societies which we have consistently advocated is secured, and the settlement of differences is left to the collective wisdom of the nation.

THE Act prohibiting the use of methylated spirit in the preparation of tinctures and mixtures used internally as medicines or beverages, has affected the annual consumption of the article. According to the report of the Inland Revenue Commissioners, there has been a reduction in the quantity of methylated spirit used from 1,070,897 gallons in the year ending March 31, 1866, to 1,031,214 in the subsequent year. We have, therefore, reason to suppose that the Act passed in August, 1866, prevented the improper use of nearly 40,000 gallons of methylated spirit in the first year of its operation.

ACCIDENTS will happen in the best regulated printing-offices, and occasional mistakes in chemical or mathematical formulæ are unavoidable. Nevertheless, there are certain errors of the press that imply culpable carelessness, and come within the legitimate bounds of public criticism. We find a brace of such errors in an article on the new anæsthetic, "bichloride of methylene," printed in the *Lancet* of February 22. The medical reader is informed that the composition of chloroform is represented by HCl_3 , and that of "bichloride of methylene" by H_2Cl_2 . These two formulæ, which are intended to elucidate the molecular structure of two important carbon compounds, recall that famous instance of imperfection, the play of Hamlet with the character of the Prince of Denmark omitted. HCl_3 represents trichloride of hydrogen, an unknown, and probably an unattainable compound; while H_2Cl_2 simply stands for a double molecule of hydrochloric acid, or 2HCl . It is scarcely necessary to remind our readers that chloroform and methylenic dichloride ("bichloride of methylene") are compounds comparable to marsh-gas, CH_4 , and that their respective formulæ, according to the modern system of atomic weights, are CHCl_3 and CH_2Cl_2 .

THE College of Surgeons, acting on the privileges conferred by the bye-laws, have gibbeted one of the notorious advertising doctors, *pour encourager les autres*. The executive committee of the General Medical Council, on the 25th ult.,

received a communication from the Council of the Royal College of Surgeons of England, stating that Mr. LIMA ABRAHAM LAMERT, lately of Bombay, and formerly of No. 37, Bedford-square, London, had been removed from being a member of that college, in consequence of the indecent character of his publications and advertisements. As a necessary consequence of this step, and in accordance with the provisions of the Medical Act, the registrar was directed to erase from the register the qualifications which the said L. A. LAMERT had derived from the College of Surgeons.

TRANSPARENT soap is prepared by drying ordinary soap in a stove, dissolving it in hot alcohol, leaving the solution at rest to allow the impurities to subside, or filtering it while hot, and finally distilling off the alcohol till the residue acquires such a consistence as to solidify when cooled in metallic moulds. This beautiful form of soap, which is largely employed in this country, is generally imported from France and Germany, the British perfumer and soap maker being precluded from entering into the manufacture by the restrictive measures adopted by the Board of Customs and Board of Inland Revenue. As a large quantity of spirit is used in the manufacture of this soap, the high duty on this spirit renders it impossible to compete with the Continental maker, who has his spirits duty free. To remedy this, it has been proposed to prepare the soap in a free manufactory, until it is in a stage necessary for the introduction of the spirit, and then remove it into a bonded warehouse, where, under the supervision of the revenue officers, the spirit could be added, and the manufacture completed; but in spite of repeated applications to the Boards of Customs and Inland Revenue, the Board of Trade, the Lords of the Treasury, and the Chancellor of the Exchequer, nothing has been done. All admit the importance of the manufacture, but the ground on which the desired facility is refused is said to be this, "If we grant the privilege to one, we must grant it to all. It is therefore better for you to manufacture your soap abroad."

THE modern refinements of water analysis have brought into sanitary reports many new technical terms, such as "previous sewage contamination," "degrees of hardness," and "albuminoid ammonia," which must puzzle poor Paterfamilias when he is endeavouring to obtain a scientific view of the contents of his cistern. Nevertheless, terms which have definite meanings must be used in scientific reports, and the attempt to describe the qualities of a sample of water in familiar language might carry an imaginative chemist beyond the proper bounds of a philosophic style. Imagine Dr. FRANKLAND imitating in his Monthly Report on the Metropolitan waters the vagaries of a writer like Mr. SALA, who thus describes the water of Saratoga springs:

"I took a glass. What was it like? Well, let me see. Say half a pint of very small beer, brewed during a thunder storm at Brentford, and retained for an unusual period in a chandler's shop in Seven Dials, where the trade wasn't brisk, and the red herrings and the pitchy fire blazers were kept on the top of the cask; then diluted with the water in which the cabbages had been boiled, and the drippings of a gingham umbrella, bought second-hand in Vinegar-yard on a very wet November day; then sent to sea, and allowed to run freely down the lee scuppers; then carefully collected in a hog tub, racked through a cask of turpentine (that came over with a ship otherwise laden with guano and Monte Videan hides, with the horns and hoots on), mingled with the refuse of a dye works, filtered through a gas-pipe, to make it sweet and clean, just freshened up—to give it a heal—with assafoetida and jalap, and well stirred with a brass candlestick far gone in verdigris."

PROFESSOR HALLIER, of Jena, whose researches into the nature of the cholera contagium are noticed in Mr. Simon's last Blue Book has extended his investigations to other contagia, and asserts that he has found in the blood of typhus, typhoid, and measles, and in the exanthems of variola, variola ovina, and vaccinia, certain *micrococci* which under proper culture give for each disease a constant and characteristic fungus. He states that in variola he gets the hitherto unknown pycnidia of *Eurotium herbariorum*; in vaccinia, the *Aspergillus glaucus* (Ik); in measles, the *Mucor mucedo verus* (Presenius); in typhus, the *Rhizopus nigricans* (Ehrenberg); in typhoid, the *Penicillium crustaceum* (Fr.) He adds that the culture experiments, especially with the variolar diseases, have been so very numerous as to exclude from the results all supposition of accident—different districts, different epidemics, and different times, having given identical results.

THE Induction Coil has been brought before Congress as an American invention. On the 14th ult. a Bill was passed in the House of Representatives, authorising the Commissioner of Patents to receive and entertain a renewed application of CHARLES GRAFTON PAGE, of Washington, for Letters Patent for his induction apparatus and circuit breakers, and if he be found the first inventor thereof, to issue a patent, reserving the rights of persons now owning and using such apparatus. According to the report presented by the Committee on Patents, the Induction Coil of RHUMKORFF, for which he was awarded in 1864 the French Imperial prize of 50,000 francs, was substantially the invention of Professor PAGE, exhibited by him in 1839 and 1840, but not patented, owing to the fact that the inventor was in the employ of the Government.

A DISCUSSION recalling the old profitless disputations of the schoolmen is continued from week to week in the columns of the *Scientific American*. The question which gave rise to the controversy was: "How many revolutions on its own axis will a wheel make in rolling once round a fixed wheel of the same size? The answer of the *Scientific American* was "one," and although "half a bushel of letters" have been written to prove that the rolling wheel will make two revolutions on its own axis, our contemporary will not abandon his original position. The question is simply a modification of one that has often been discussed: "Does the moon turn on its own axis as it revolves round the earth?" We contend that the arguments of the *Scientific American*, and those of the few people who will not admit the axial revolution of the moon, are based on a misconception of the accepted meaning of the phrase "revolution on its own axis." Taking any point on the periphery of the moving wheel we find that it comes opposite to a given point in space twice while the wheel is rolling once round the circle, and as the question refers to the absolute motion of the wheel, and not to its relative motion, this fact seems to us to be plainly indicative of two axial revolutions.

CHLORODYNE FROM AN AMERICAN POINT OF VIEW.

THE following note upon chlorodyne is reprinted from the *Druggists' Circular*, of New York:—

"A correspondent writing from Cincinnati keeps the chlorodyne 'ball in motion' by sending us what he affirms to be the formula for a preparation in general use in Cincinnati. He states that when chlorodyne is ordered in that city, it is understood to mean *Chandler's chlorodyne*. We

cannot help thinking that this nostrum is a good deal over-magnified. We know of no special virtue it possesses over the many preparations that have long been in use, about which there is no mystery, and no ground even for conjecture. Dr. Collis Brown ('a retired surgeon of the British army,' as he styles himself) seems to be getting more shakels and more transient glory out of his chlorodyne than any one else. Advertising seems to have made both it and him famous together; and it happens in this, as it happens in most other like cases, an apparent success in an undertaking is sure to be the signal for a hundred imitators, pirates, trade highwaymen, and what-nots, who generally in the end make a sad mess of the whole thing, and destroy whatever little character the original preparation may have had the luck to achieve. Our correspondent labours under the notion that it is a remedy only for cholera, and is not to be used in common diarrhoea. Bless him! it is used for all sorts of pains and aches, and sleeplessness, and, in short, whenever the nerves are in fault, and *opium might be useful*; and sometimes with an effect not much inferior to that of a dose of morphia."

As the formula referred to by this slashing writer differs in many respects from that published by Mr. SQUIRE in his new *Companion*, we reproduce it here:—

CHANDLER'S CHLORODYNE.

R Morphiæ mur	grs. viii.
F. ext cannabis indicæ	3 ss.
Ol. menth. pip	gtts. x.
Tinct. capsici	gtts. xv.
Chloroform	3 ii.
Alcohol, 98 per cent.	} aa—3 i.
Glycerin, pure	

Dose 10 to 30 drops in a wineglass of water, repeated every three hours.

According to the American writer, this preparation, when properly made, is of a clear greenish colour; but a false colour is sometimes given to it with caramel.

PROFESSOR WILLIAMSON ON SCIENTIFIC EDUCATION.

THE Professor of Chemistry in University College, London, is an original thinker whose opinions must always command attention. His recent discourse on experimental science as the basis of general education dispels the fog of vague ideas surrounding the popular theme of technical instruction, and reveals the true object of a training in experimental science. The following account of Dr. WILLIAMSON's lecture, taken from a leading article in the *Lancet*, indicates the drift of his arguments:—

Professor WILLIAMSON strenuously opposes a fashionable modern view of the proper function of scientific teaching in the business of education—the view, namely, which regards technical education as the object of such scientific teaching as is to be accorded to youth. He maintains, on the contrary, that a training in experimental science is to be considered as the most important element in the primary education of all classes of the community. He vindicates BACON from that common misinterpretation of his views of the great method of inquiry introduced by him, which assumes that the object of experimental science is to increase the material resources and comforts of mankind. So far from this, BACON taught that the principal object of the experimental method was to enlarge the understanding, and to train the mind for the search after truth. But this is the very basis of all sound education whatever; and in pro-

portion as a man lacks this preliminary training will he be more or less unfitted for the apt acquirement of any special technical knowledge which may be subsequently necessary to him.

Selecting chemistry as the typical example of experimental science, Professor WILLIAMSON shows that it deals first of all with an exact appreciation of those commonest and simplest facts which may be called the "Alphabet of Nature;" and that it obliges the student to investigate these with the strictest regard for truth and accuracy. A qualitative chemical analysis is like a judicial inquiry: it is a rigorous examination and confrontation of witnesses—of witnesses who can be compelled to answer truly only by the strictest candour and painstaking on the part of the interrogator, but who thus interrogated will not fail to give reliable evidence. The simplest chemical analysis is thus a model of all true investigation and reasoning; and it is, therefore, idle to argue that because a man's vocation in after life may be entirely removed from those spheres in which the technical use of chemistry is needed, a primary education in that science is of no advantage to him. On the contrary, it will familiarise him with that accurate observation of facts and that cautious use of reason in interpreting them, which are the soundest, and indeed the only, satisfactory foundation for all special acquirements whatever. Technical education, in the sense in which that proceeding is now being recommended, is, in Professor WILLIAMSON'S opinion, a mistake; and he points to the fact that experiments of this kind which have been made in foreign countries have proved failures, and are being abandoned. And, above all, he protests against the exclusive patronage which has been hitherto conferred by our Government on the endowed technical schools which it has established. He objects even to the money spent on the endowment of these establishments; for it might have been far more usefully expended in providing scientific training for the pupils in primary schools. But he especially complains that the further injustice is done of practically monopolising to the students educated in these endowed schools the appointments under Government for which their education fits them. He very justly remarks that this is a most unsatisfactory and even dangerous mode of testing a theory like that upon which technical education in special arts is afforded to youth. At least let there be free competition on equal terms between the students of endowed technical schools and persons who have learned their business in their own independent way.

ADULTERATION OF FOOD AND DRUGS.

LAST month, in an Editorial Note, we referred to a Bill which had been drawn up by Mr. POSTGATE, F.R.C.S., of Birmingham, to amend the Adulteration Act of 1860, and to prevent the adulteration of Drugs. We now extract from the current number of the *Pharmaceutical Journal* a fuller account of this Bill:—

"The preamble declares that the practice of adulterating articles of food, and drink, and drugs, in fraud of her Majesty's subjects, and to the great hurt of their health and great danger of their lives, requires to be repressed by more effectual laws than those now in force.

"By the first clause, adulteration is made an offence. The clause runs thus:—Every person who shall admix, and every person who shall order any other person or persons to admix with any article of food or drink, any injurious or poisonous ingredient or material, to adulterate the same for sale; and every person who shall admix, and every person who shall

order any other person or persons to admix, any ingredient or material with any drug, to adulterate the same for sale, shall be guilty of a misdemeanour, and be imprisoned for six months with hard labour.

"Clause 2 refers to persons knowingly selling adulterated articles of food, drink, or drugs, and the penalty, where offences are proved, is increased to £50. One object aimed at in this clause is to afford some protection to the retailer who obtains adulterated goods from the wholesale dealer.

"Clause 3 substitutes the words 'shall appoint' analysts, in lieu of 'may appoint' analysts, and is made to apply to drugs as well as articles of food and drink. The appointments of analysts is by this clause rendered compulsory, the present Act only making it permissive.

"Clause 4 gives power—in Great Britain to one of her Majesty's principal Secretaries of State, and in Ireland to the Lord Lieutenant—to appoint one or more competent persons to act as commissioners to confer with and assist the local authorities to carry out and enforce the Act. The duty of such commissioners will extend to remote and unpopulous districts where salaried analysts are not likely to be appointed.

"Clause 5 provides that the Inspector of Nuisances, or the Inspector of Weights and Measures, or the Inspector of Markets, one or all of them, as the local authority appointing them may determine, in every district, county, city, or borough, shall procure and stamp samples of articles of food, or drink, or drugs suspected to be adulterated, to be analysed by the analyst appointed under this Act, and shall, upon receiving the certificate of the analyst stating that the articles of food, or drink, or drugs are adulterated, cause a complaint of an offence against this Act to be made before the Justices of the Peace, who shall cause a summons to be issued, requiring the seller or adulterator of such food, drink, or drugs to appear before the magistrates, and answer the charge; the expenses of such prosecution, if not ordered to be paid by the party complained against, to be deemed part of the expense of executing this Act.

"Clause 6 requires the analysts to make reports quarterly, which are to be read publicly at the meetings of the bodies appointing them.

"Clause 7 contains detailed provisions as to the proving of the case before the justices.

"Clause 8 provides that any purchaser of any article of food, drink, or drugs, in any district where analysts are appointed, shall be entitled, on payment of not less than one shilling, and not more than five shillings, to have such article analysed, and to receive from the analyst a certificate of the result of the analysis. In the event of a prosecution, the cost of such analysis to be deemed a part of the costs.

"Clause 9 provides that the analysts or inspectors appointed shall from time to time report to the magistrates upon the prevalence of injurious or poisonous adulterations in articles of food or drink, and of adulteration of drugs, in any manufactory in their district; and the magistrates shall order such manufactory to be inspected for the seizure of all injurious or poisonous substances used in such adulteration; and likewise order samples of food and drink or drugs in such manufactory to be taken for analysis to the analyst, who shall report to the magistrates the result. If they are found to be adulterated, a summons to be issued.

"Clauses 10 and 11 relate to the mode of prosecution, and the fund out of which the costs are to be paid.

"We are informed that Mr. Postgate has placed the Bill in the hands of Mr. Dixon, M.P., to be introduced into Parliament this session."

DISPENSING FROM PRESCRIPTIONS.

THE American papers are discussing a rather curious, and not uninteresting, question, which concerns us here as well as our transatlantic brethren. Nothing is more common than for a druggist to dispense a score of times, and at long intervals, from the same prescription of a medical man without any renewal of the medical authority. The moral and legal right to do this is disputed; and the *New York Medical Record* publishes the following "legal opinion":—

"1. The prescription is a direction from the physician to some druggist to put up for and prepare for a patient's use a certain medicine. When the druggist performs this act and files away the prescription, he has no right to again put up or prepare medicine from that prescription, unless he does so by the order of the physician who originally gave it. He has no more right to do so than a merchant would have to deliver on a written order for one barrel of flour or sundry barrels after the one called for was delivered. A more important feature is, however, involved in the matter of physicians' prescriptions being duplicated by a druggist, without the physician's authority or instruction, which is, that the medicine so duplicated may be entirely unsuited to the patient's changed condition of health, which the druggist has no opportunity of knowing. No one is capable of judging in such matter but the attending physician. The druggist that duplicates a physician's prescriptions without the physician's orders, commits a crime against society, inasmuch as he permits medicine to leave his store which may cause the death of the person to whom it is administered.

"2. Medical societies have a right to prescribe and establish a rule for the government of druggists in such matters, which no doubt druggists would carefully observe. This would save the medical profession from many charges of mal-practice, and many persons from the injuries resulting from the continued use of a medicine not advised or prescribed by a physician."—*British Medical Journal*.

UNIVERSITY OF LONDON EXAMINATIONS.

THE new Calendar of the University of London contains but few alterations or modifications affecting the examinations for degrees, but the following are those interesting principally to the medical profession. At the Matriculation Examination, beginning in 1870, the passages for translation in French and German will be entirely taken from books not previously selected. At the Preliminary Scientific M.B. Examination there will for the future be separate examinations for honours in Botany and Zoology, and an exhibition in each subject. At the First M.B. the subjects for the practical examination in Organic Chemistry will be selected for the future from a given list. This is a manifest improvement, since the range of organic substances which might possibly be given for examination is so wide as to distract the student's attention without some limitation such as that now afforded. At the M.S. Examination the award of the gold medal is made dependent upon proficiency in Surgery only, and the corresponding medal at the M.D. Examination upon Medicine only; this is but reasonable. The number of those who obtain degrees at the University of London does not undergo any material increase from year to year; for, although many may enter to the race by matriculating, it is only a few, and those the best men, who pass successfully through the several and severe ordeals by which the coveted honour is to be gained.—*Lancet*.

Report ON THE CONDITION AND PRACTICES OF THE VARIOUS CLASSES CONNECTED WITH The Drug Trade.

III. COFFINITES, ETC.

THROUGH the want of necessary details relative to the biography of the late Dr. Coffin, we are greatly at a loss to account for the disorganised and antagonistic condition in which he has left his "great school of medical botany."

In the metropolis alone there are many emporia for the sale of the Coffinite remedies. The proprietor of each claims to be the sole true disciple of the departed Coffin. The statements put forth are so definite and positive in character, that every handbill and placard wherein the facts are stated carries conviction—at least until the rival's statement has been perused—that here we have the man upon whom the mantle of the departed "Doctor" has fallen.

In one of the most populous of our leading thoroughfares we find no less than three pretenders to the vacated position of the departed doctor. The first informs us that he "was the late Dr. Coffin's confidential and only medical assistant up to the time of his death." Says No. 2, "Dr. C. and myself alone attended to the patients." "I was the chief medical coadjutor of the late Dr. Coffin," asserts No. 3. "I alone have testimonials from Dr. C.'s patients; and when I established my botanic dispensary, Dr. Coffin and Co. were not known." The last allusion is to a rival No. 3 has higher up the street.

Taking into consideration the number of Coffinite shops in existence, we are driven to the conclusion that if there be any foundation of truth in these diverse statements, the late head of the Coffinite code of health must have been blessed with an army of assistants, whose inherent dislike and jealousy towards each other could only be restrained by the influence of the dominating mind of the leader himself. At the demise of this leader, his disciples broke out into open warfare; the school of Coffin was at an end, and each assistant shook his fist in the face of his fellow and went his own road, purchased some dry herbs and a tin still, and "set up for himself." So far as our observations have extended, there is not a wide difference between a Coffinite and a mere herbalist. The Coffinite has a larger and cleaner shop, but his mode of business would seem to be founded upon the same commercial principle which regulates the trade of the less pretentious herbalist,—herbal nostrums, and a large quantity of them, for a very little money.

The pious horror with which the herbalists regard the medicaments derived from the mineral kingdom is also a characteristic trait in the Coffinite. "In issuing," says a leading practitioner, "this list of domestic medicines, our object is to put into the hands of the people the means that shall enable them to remove the first stages of disease. As to the nature of the medicines here mentioned, we would simply say, that they are all from the vegetable kingdom, and non-poisonous." Next follows the list of domestic medicines, in which again we recognise the herbalist's nostrums under a thin disguise. What the outspoken and wholly illiterate herbalist denominated "wind pills," the Coffinite terms "anti-spasmodic drops;" "rheumatic drops" become "neuro tonic drops," and so on.

Yet another pretender, whose boast it is to depend upon the vegetable kingdom only. This energetic individual assumed during his lifetime—he is dead, though his system and his storehouse, as also his advertisements, survive—the

title of "professor." The "professor," by the vehemence of his placards and his pertinacious advertising, managed to drive a brisk trade while alive. He sold his pills by the hogshead, he took a large house in the Euston-road, decorated the top of it with a roaring lion in stone, set up an illuminated clock in the centre of the front wall, and at his death, his followers, as we are informed by an inscription, erected in the professor's front garden another lion in stone—this time in repose. Carved in enduring granite, we read that the memorial "was raised by a penny subscription, A.D. 1855. The Blood is the Life." On another side of the plinth we read:

"SHAKESPEARE ON POISONS ENTERING THE BLOOD.

"The leperous distilment, whose effects
Holds such an enmity with the blood of man,
That swift as quicksilver it courses through
The natural gates and alleys of the body,
And with a sullen vigour it doth posset
And curd, like eager droppings into milk,
The thin and wholesome blood."

The professor has few branches or shops affiliated to the central warehouse in the Euston-road; but wherever we come upon one of these succursals, we may be sure of seeing quackery appealing to us in its loudest and most nauseating form.

We believe it may happen sometimes that the particular code of hygiene to be followed is determined by the possession of a single item in the stock-in-trade of the quack medicine seller. The Coffinite dépôt is adorned with a plaster bust of the late Dr. Coffin; the follower of the College of Health displays in his window the bust of Professor Morrison; whilst a third, without making any pretence to be connected with homœopathy, ornaments his shop with the bust of Dr. Hahnemann. There are many shops in the metropolis falling within the last category, which do not dispense homœopathic medicines at all, but are constrained to follow the fashion of having the counterfeit presentment of some great man departed on their shelf.

Soaring beyond the highest flights of the Coffinite and the herbalist is that living "professor," who being turned out of his house by the Commission for building the new law courts, which are presently to adorn this metropolis, can proudly erect further west a stone mansion as tall and imposing as any in the metropolis. The "professor's" pills and ointment are known all over the world. His bills are posted on the pyramids, his advertisements are printed in Syriac and Devanagari. The pills and the ointment have dispelled, as by a charm, the ills of luxurious English noblemen and ague-stricken Hindoos—*vide* testimonials. The professor has no branch establishments, only the big stone mansion, a numerous staff of clerks and porters, an immense stock of the necessary ingredients, and plenty of cash to spend in advertisements. He need not puff his own wares by stating theories about poisons in the blood, or the evils of vaccination; he can leave Coffinite and herbalist far behind, for he has a larger command of capital, and is, moreover, a shrewder and more business-like quack.

Thus far have we passed in review the outside edge, the disreputable fringe of the profession. Probably these "pariahs" would have received no notice in these pages, were it not necessary to show how deeply a truly estimable calling may be degraded by ignorant pretenders, or by specious humbugs, who seek to amass a fortune by acting upon the mental and physical weakness of humanity.

The following classical invitation to a medical meeting was recently issued at New York: "Doctores! Dacum nex mundi nitu Panes: tritucum at ait. Expectu meta fumen tu te & eta beta pi. Super attento uno Dux, hamor clam pati; sum parates, homine, ices, jam, etc. No Sideror Hoc. 'Festo qesonan floas sole.' Nov. Ebor Jan. 20."



Pharmacy and Therapeutics.

ON CONCENTRATED INFUSIONS.

BY M. J. ELLWOOD.*

IN the *Pharmaceutical Journal* for February, 1855, is an account of a discussion on the preparation of concentrated infusions, in which Dr. Farre, one of the editors of the *London Pharmacopœia*, is reported to have said that, "for the preparation of infusions it would be unjustifiable for a pharmacist to substitute any other process than that given in the *Pharmacopœia*;" and in the same discussion Dr. Redwood said he "confessed that his experience was not favourable to the substitution, under any circumstances, of concentrated infusions for those made according to the *Pharmacopœia*." The increasing use of concentrated for fresh infusions is no doubt due to the facility with which prescriptions ordering infusions can be dispensed; and as their use will continue in spite of what may be said or written, it becomes important to ascertain in how far the concentrated preparations do really represent the fresh. Of the medicinal value of infusions in mixtures I am not qualified to speak, but we are all aware of the important part they take in giving flavour and appearance, and therefore any difference in either of these characteristics is a source of uneasiness to the patient and of annoyance to the dispenser. I would call the attention of pharmacists to the unsatisfactory plan of substituting concentrated for fresh infusions, and I would recommend those in the habit of using the concentrated to make a careful comparison of the two preparations, when I think the false character of the concentrated will be very apparent. Many of the concentrated infusions at present supplied by manufacturing chemists are very inferior imitations of the *Pharmacopœia* preparations; and for my own part I do not believe it possible to make a concentrated infusion that will in all respects represent its original. Take as instances the infusions of orange-peel, cloves, cascarrilla, buchu, chamomile, and others possessing aroma, they cannot be prepared by maceration in hot water and subsequent evaporation, nor will the usual plan of maceration in a mixture of spirit and water produce infusions to equal in any respect those freshly prepared.

The same infusions prepared by different makers vary very considerably both in colour and taste; and some of those sent out by one firm are so unlike the fresh, that I question whether the maker ever saw the *Pharmacopœia* infusions.

To illustrate what I have said, I append an account of experiments lately made. It is difficult, however, to convey in writing any accurate idea of the extraordinary difference in appearance and taste of the two kinds of infusion, and I would therefore advise my readers to make experiments for themselves.

Infusion of Chamomile, when freshly made, was very much darker than that made from the concentrated, and possessed more of the taste and odour of the flowers. A pint made with the concentrated yielded on evaporation 65 grains of extract; a pint of the fresh yielded 76 grains.

* Communicated by the Author.

Infusion of Calumba, prepared from the concentrated, was a little darker, and not so bitter as the fresh, and possessed a strong spirituous smell and taste. A pint, made with concentrated, yielded 25 grains of extract; a pint of the fresh gave 35 grains.

Compound Infusion of Orange Peel, made with the concentrated, was in colour darker than tincture of orange peel, and possessed but little of the aromatic smell of the fresh. A pint yielded 102 grains of extract, whereas a pint of the fresh yielded but 65 grains.

Compound Infusion of Gentian, made with the concentrated, was darker, and tasted stronger of the gentian than the fresh, but was not so aromatic. A pint yielded 70 grains of extract; the fresh gave 93 grains.

Infusion of Cascarilla, from the concentrated, was darker than the fresh, and very inferior, both in taste and smell. A pint yielded 50 grains of extract; the fresh yielded 40 grains.

Infusion of Buchu, made from the concentrated, gave most unsatisfactory results. I procured samples by four makers, not one of which gave an infusion similar in appearance, or even, with one exception, approximating to the Pharmacopœia infusion. One sample was almost as dense as syrup, and had a very suspicious odour with it; three produced infusions as dark as tincture of gentian; and the fourth became turbid on the addition of water. A pint made with the "syrupy" sample, yielded 125 grains of extract; and a pint of the fresh, only 52 grains. The extract from the concentrated possessed no smell whatever; that from the fresh, however, had a considerable odour of the leaves.

Acid Infusion of Roses, prepared fresh, was a little darker than that made from the concentrated, but the difference was barely perceptible; that from the concentrated tasted stronger of the acid.

Infusion of Quassia, made from the concentrated, was in most respects a good imitation of the fresh; but then its spirituous taste and smell are objectionable.

Infusion of Chiretta, made with the concentrated, was neither so dark or bitter as the fresh.

These samples were examined, but none gave like results, either in appearance or taste. The presence of spirit in the infusion, made from the concentrated, was very perceptible.

In conclusion, I may remark that so long as concentrated continue to be substituted for fresh infusions, complaint of want of uniformity in the medicines supplied by dispensing chemists will be inevitable.

DOSES AND ACTIONS OF MEDICINES.

A SUGGESTIVE paper on the Doses and Actions of Medicines was read at a recent meeting of the Harveian Society, by Dr. FULLER.

The author considered that the prevalent distrust in the efficacy of drugs might all be resolved into the three following formulæ:—1. The natural reaction from the overweening confidence in medicine, and from the wholesale and indiscriminate administration of drugs which prevailed at the beginning of the present century. 2. The discovery that certain disorders, if left to themselves, in many instances tend to recovery. 3. The prevalence of extreme ignorance as to the dose in which each drug is tolerated by the system, and as to the dose in which it must be administered in order to obtain its curative effect. After enlarging somewhat on these points, Dr. FULLER concluded an able paper by remarking that by one means or another distrust had come to prevail, and discredit had been thrown on the curative action of drugs. Disease was left to take its natural course, and homœopathy was practised under the guise of scientific

medicine. The public, who see by the reports of cases in our periodical literature how little heed some men pay to medicine, were becoming indoctrinated with the belief that drugs are of no avail, and were consistently betaking themselves to the professed homœopath. For this belief Dr. FULLER maintained that there were absolutely no grounds, and urged the Society to appoint a committee for the purpose of investigating the subject of therapeutics and the action of medicines. If, he said, it should prove on inquiry that drugs are of no avail in modifying the course of disease, let us, as honest men, avow our mistake, alter our practice, and admit that homœopaths have had just cause for their vilification of the legitimate practice of medicine; but if, on the contrary, the labours of the committee resulted in establishing the curative action of medicines, where properly administered in doses and in combinations suited to the exigencies of each case, the profession might fairly hope to obtain as the result of the investigation some trustworthy therapeutical data. The investigation must necessarily be coeval with the existence of the healing art; but the labours of the committee, if carefully conducted, would serve as a model to future inquirers; the conclusions at which they arrived would be a nucleus to which other facts might be added from time to time, until information was obtained in the healing art which would be indispensable to every practitioner; and meanwhile the Harveian Society would have the honour of inaugurating an inquiry which would not have been unworthy of the Royal College of Physicians.

A long and animated discussion took place, in which Mr. Sedgwick, Dr. C. J. B. Williams, Dr. Broadbent, Dr. Sutton, Dr. Drysdale, Mr. Brown, Dr. Kidd, Mr. Baker, Dr. Silver, and others took part.

Eventually a motion was carried appointing a committee to make a preliminary report to the Society at as early a date as convenient. The committee is to consist of the following, with power to add to their number:—Drs. Broadbent, Tilbury Fox, Fuller, Hare, Hickman, Handfield Jones, Norton, Pollock, and Sieveking; Messrs. Ernest Hart, Curgenvin, and Sedgwick.

DRUGS AND DISEASE.*

IN the admirable address delivered at the first meeting of the New Clinical Society of London by its President, Sir Thomas Watson, he draws attention to the utterly unsatisfactory condition of that department of medical science, which is the ultimate and supreme end of all medical research, therapeutics. He pointed out as a prime cause our ignorance of the action of drugs and other therapeutic agents upon the bodily organs and functions. Our knowledge of anatomy, pathology, and the diagnosis of disease, have advanced with marvellous strides, and have attained to a considerable degree of certainty and perfection; on the other hand, the state of therapeutical knowledge is "a standing reproach" and discreditable to medicine as a science. We are "continually fluctuating in a sea of doubt in questions of the gravest importance;" our practice is "hap-hazard and inconsistent." We know that, whatever cures may have been wrought in some cases by our predecessors a hundred years ago, the bills of mortality were terribly increased by their fatal activity in others. The experiments of Dr. Hughes Bennett on pneumonia, and Dr. Gull in rheumatic fever, show that we are not free from this reproach in our own time. We may read every week accounts of successful treatment of the same disease on the most opposite principles, and by the use of remedies which

* Reprinted from the *British Medical Journal*, Feb. 1.

are deemed antagonistic in action, so that men are tempted to ask, Is there any virtue in medicine? The truth is, that scientific inquiry has been almost exclusively directed to physiology and pathology, and the brilliant results obtained in these great fields have attracted crowds of eager writers, while the systematic and accurate investigation of the action of remedies has been neglected, if not despised. We have been content to go on much in the old way, resting principally upon tradition, and getting what additional light we might from the superficial observation of the general results of treatment in a few isolated cases. We cannot hope ever to elevate therapeutics to the dignity of a science after this shallow and desultory fashion, nor can we fairly expect even to attain to a rational empiricism with any reasonable speed. It is only by conducting experiments on a large scale, as, for instance, by adopting a certain plan of treatment for a particular disease at different hospitals, simultaneously, that we can confidently expect satisfactory results.

The Clinical Society will be able to do much, as Sir Thos. Watson says, by accumulating observations of the action of drugs on the diseased and on the healthy body; and the discussion of the evidence by keen and instructed minds must bring light. Yet there are questions awaiting decision which urgently call for more thoroughly organised and fundamental action than can be obtained by this means. Take, for example, the question of the efficacy of alkalisation in acute rheumatism. On the one hand, it is affirmed that it confers immunity, almost, if not absolutely complete, from the terrible complication of carditis; while, on the other, it is confidently declared that the absence of any treatment by drugs gives the best results. If the former statement be correct, a discovery of immense importance to mankind has been made; if the latter be true, we have been and still are daily doing grievous harm by active treatment. In a disease so common as acute rheumatism, the truth might surely be accurately ascertained by systematic and unprejudiced investigation, and the positive safety confirmed by a certain remedy may be secured in universal acceptance, or the evil effects of mischievous interference generally prevented without much further delay.

In these days, indeed, it must be confessed that we are greater at prevention than at cure. We have reason to be proud of the progress of sanitary medicine. Dr. Buchanan states, in Mr. Simon's report to the Privy Council, that not only have zymotic diseases wonderfully decreased in those towns where drainage and sewerage have been improved, but that phthisis has also declined in a marked degree. The history of the last cholera outbreak may fairly be quoted as an instance of successful resistance to the spread of an epidemic which formerly seemed to be uncontrollable, while the present outbreak of fever in Essex is a significant example of the fatal results of the old-fashioned neglect of sanitary precautions.

Although, however, we cannot indulge in the sanguine hopes which the old physicians entertained of curing disease positively and directly by actual antidotes, we are justified in expecting to obtain considerable power over it by controlling and directing the natural forces of the body. In many cases, it is true, and it has been well observed, we can but look on, as it were, and see fair play in the terrible conflict between life and death. When diseases were believed to be the manifestations of actual entities working evil within the body, it was reasonable enough to suppose that they might be driven out—the possessing demons expelled, as we expel a worm or remove a calculus. Now we stop ague and kill parasites; and there, for the present, at any rate, our absolute power may almost be said to end. With the increase of our knowledge of the materials with

which, and the mode in which, the healthy tissues of the body are built up, and of the series of changes which take place in these under morbid conditions, our prospect of being able to control these changes will improve also. The more we learn of pathology, too, the more we find that diseases which we have been accustomed to look upon as distinct, are soquolm of others, and dependent on some antecedent changes. The diseased condition, once advanced to organic stability, will remain irremediable; but, if we can discover the early stage of its process of first establishment, it is within the bounds of probability that we may be able to remove it, or at least arrest its further progress. In order to ascertain our power in this respect, it is necessary that we should first know the precise effect of the means available for the purpose. There is as yet hardly any groundwork on which to form a positive science of therapeutics. The action of medicines must first be traced through a series of complex laws of organic chemistry and nervous action of which we barely know the rudiments. We must, therefore, be content to make shift with empiricism for a season, until we have gathered more sufficient data on which to proceed. That our empirical treatment should be so uncertain and contradictory, is nevertheless a shame and reproach to us. We prescribe medicines every day, of the action of which we know literally nothing, the belief in their virtue being held in vague tradition, or founded on the wildest theory. What, we may ask, has been reasonably proved to be the action of the so-called "refrigerants," or "antispasmodics," or "expectorants," or "alteratives," or of a hundred individual drugs which might be enumerated? What has been ascertained concerning the difference in effect of the different salts of the same metal or alkaloid? There are drugs, certain properties of which are clearly proved and placed beyond doubt, such as mercury and antimony; and yet we are distracted by doubts whether the powerful influence they exercise on the body be for good or evil in the diseases for which they are given. It is surely within the scope of our present ability and knowledge to obtain some certainty on these important points; and it is gratifying to find that the work has been commenced. The British Medical Association has worthily led the way by granting a sum of money to Dr. Hughes Bennett towards enabling him to prosecute researches upon the value of mercury; and he is at present engaged in this important investigation. The Royal Medical and Chirurgical Society appointed a committee to examine the effect of remedies administered by subcutaneous injection, and their report has given reliable information of the highest value. Dr. Acland urged upon the Medical Council the necessity of applying to therapeutics the same method of investigation used in other scientific inquiries, and suggested that funds should be granted by that body for this purpose. The proposition received strong support; and, although eventually rejected by a majority of the Council, the discussion which took place showed that the urgent need for such an inquiry was fully appreciated by many of the leading minds in the profession, and is rapidly becoming generally acknowledged.

When we have ascertained the natural history of disease uninfluenced by any treatment, and have determined the general effect and value of particular remedies under certain circumstances, the true office of the physician will come into play, in deciding what is best to be done in individual cases; a problem sufficiently complicated by idiosyncrasies, peculiarities of epidemic constitution, locality, the combination of maladies, and the like. We heartily hope, therefore, that the Clinical Society will worthily carry out the programme laid down by its President, that other societies and individuals will help in the work, and that before long a

complete scientific inquiry into the action of medicines will be carried out by able and unprejudiced observers. It is time that we should awake to the greatness of the task which lies before us, and that we should be known hereafter as a generation not wholly divided into sceptics and empirics, but anxious to make bricks, and to prepare a foundation, if unable to aspire to shape the design or erect the pillars of the perfect temple of regenerate medicine.

ON THE SPECIAL ACTION OF THE PANCREAS ON FAT AND STARCH.

BY HORACE DOBELL, M.D. *

I HAVE been engaged for several years in experimenting with the secretion of the pancreas. The inquiry of which I now make known the results has reference especially to the mode of action of the pancreas upon fats—a point which has been the subject of investigation by various physiologists over since the discovery of the influence of the pancreatic fluid on the absorption of fat by Claude Bernard, nearly twenty years ago.

In the chemical parts of my experiments I owe much to the efficient aid of my friend Mr. Julius Schweitzer, and to the energy and perseverance with which he carried out my suggestions under many difficulties.

The objects of my investigations have been as follows:—

1. To discover the exact character and nature of the influence exerted by the pancreas upon fats.

2. To discover a means of obtaining and preserving the active principles of the pancreas in a form suitable for experiment in the laboratory, and for administration as a remedial agent.

3. To discover the effects of the administration of the active principles of the pancreas as a remedial agent in certain wasting diseases, and to test, by an *experimentis crucis*, the truth of a conclusion on this subject, at which I had previously arrived by a process of inductive research.

I shall not occupy the valuable time of the Society by narrating the many more or less unsuccessful experiments, but restrict myself to a concise record of those attended with success.

Experiments were made with the pancreas of several different animals, but that of the pig was selected for the experiments of which I am about to give the results, as being nearest in the character of its functions to that of the human subject.

In order to ascertain the normal reaction of the pancreatic juice, and whether this is altered by the length of time that has elapsed since the last meal, the following experiment was made with the assistance of Mr. Schweitzer and of Mr. Harris of Calne, who kindly placed his extensive pig-killing establishment at our service for the purpose.

On March 22, 1866, forty pigs were killed, and the pancreas of each examined immediately after death; the killing and examination were so rapidly conducted, that the pancreas was in each case examined while warm from the body; and the killing and examination of the forty pigs in succession occupied less than an hour.

The pigs were killed ten at a time. The first ten had been fed two hours before they were killed, the second ten five hours, the third ten nine hours, and the fourth ten had not been fed for two days.

The pancreas in each group presented the same characters in size, colour, and reaction. Each pancreas was cut through so as to lay open the principal duct, but in no case was there any fluid in the duct. Litmus-paper was applied to the interior of the duct and to the divided gland-cells, and on being pressed sufficiently against the tissues to absorb moisture, the paper was in each case reddened where it was moistened. This acid reaction was not found in the fat and muscles of the animal.

At my request, Dr. Collins, of Albert-terrace, Regent's Park, examined the reaction of the pancreas in a series of

cases at the moment when all the digestive organs were under active excitement. He gave the pigs a good and relishing meal, and while they were eating it, divided the spinal marrow in the neck, so as to destroy sensation in the body. The pigs were then immediately cut open, the pancreas removed, and its reaction examined. On August 3rd he wrote me: "As you requested, I have tried a series of experiments upon the pancreas, parotid, and sublingual glands. The two latter have a decidedly acid reaction, but the pancreas I am not quite so certain about; in one batch of pigs killed in Buckinghamshire it was alkaline, but in another lot in Hertfordshire it was acid."

The reaction of the pancreas is always acid when it reaches the laboratory for experiment as quickly as possible after removal from the animal. This we have proved in many hundreds of instances.

To discover the influence of the pancreas upon fat, the fresh pancreas of the pig, freed from all adhering blood and other extraneous matters, was cut into small pieces, bruised, and mixed with lard; and to this mixture water was gradually added. In the bruised condition the pancreas had an acid reaction. By stirring this mixture of pancreas, lard, and water, the fatty character disappeared, a thick, white, creamy fluid being formed, which, on standing, solidified into a firm pasty mass. This mass had also an acid reaction. In order to free it from the *débris* of pancreas, it was pressed through muslin, and a uniform smooth, creamy emulsion remained. This emulsion rapidly putrefied, but remained a permanent emulsion until putrefaction set in.

The following are the microscopical characters presented by pure lard before mixture with pancreas, and by this emulsion, which I call "crude emulsion":—

1. "Lard" (pure).—Aggregations of ordinary acicular crystals of margarine. No oil-globules. No water.

2. "Crude emulsion."—A tolerably uniform granular mass with *separate* acicular crystals of margarine, oil-globules, and water abundantly distributed throughout the mass. In some places the crystals are aggregated as in No. 1. The granules range from the $\frac{1}{5000}$ to $\frac{1}{15000}$ of an inch in diameter.

This mixture of fat and water differs from all other mixtures or chemical combinations of fat and water in the following particulars:—

When the "crude emulsion" is put into ether, the ether separates it into two strata:—

- a. An ethereal stratum above containing the fat.
- b. A watery stratum below.

When the upper stratum (a) (etheral solution of fat) is drawn off and the ether evaporated by a cautiously regulated heat, a pure crystalline fat remains, which I call "pancreatized fat." This pancreatized fat has no tendency to putrefy, and will keep for an indefinite period. It presents the following characters under the microscope:—

3. "Pancreatized fat" (lard) consists of minute *separate* acicular crystals of margarine and fine granular matter uniformly distributed. The special character is the *complete loss* of aggregation of the crystals.

This "pancreatized fat" retains the property of mixing or combining with water, and forming a thick, smooth, creamy emulsion, that it possessed in the form of "crude emulsion" before solution in ether. The emulsion formed by mixture of "pancreatized fat" with water I call "purified pancreatic emulsion." It has, like the crude emulsion, an acid reaction, and will keep for a very long time, and presents the following microscopical characters:—

4. "Purified emulsion" (No. 3, spirit and water).—As nearly as possible the same as No. 2; the *separate* crystals more uniformly distributed, and fewer aggregations of them. No globules.*

On analysis of the lower watery stratum (b) resulting from the separation of the fat of the crude emulsion by ether, it is found to contain *no glycerine*.

On analysis of the pancreatized fat (3) obtained by evaporating the ether from stratum a, it is found that 100 parts of the pancreatized fat are saponified by 54 parts of oxide of lead, and yield 146.25 parts of lead-plaster, and 6.75 parts of glycerine.

It is also found that every 100 parts of lard used in

* Communicated to the Royal Society.

* In cold weather it is necessary to gently warm the glass slide before placing the above specimens upon it, otherwise the solid constituents become agglomerated.

making the crude emulsion produce 106.5 parts of pancreatized fat, the increase of 6.5 parts being solely due to absorption of water, as proved by heating the pancreatized fat, when the water separates, and the pancreatized fat is reconverted into ordinary lard.

In all the foregoing respects the pancreatic emulsion of fat differs entirely from all other kinds of emulsion of fatty matter, whether chemical or mechanical. All other emulsions of fat are destroyed by ether, the fat being restored at once to its original condition.

The influence exerted by the pancreas upon fats, therefore, appears to operate by breaking up the aggregation of the crystals of the fat and altering its hydration. It alters the molecular condition of the fat, mingling it with water in such a way that even ether cannot separate the fat from the water. A permanent emulsion is thus formed ready to mix with a larger quantity of water whenever it may be added.

The pancreas, therefore, in acting upon fat, does not decompose it into fatty acid and glycerine, the absence of the glycerine from the watery stratum (b), and the presence of the glycerine in the pancreatized fat of the ethereal stratum (a), having been demonstrated.

Action of the pancreas upon starch.—It is well known that, in addition to the influence of the pancreas upon fat, it has the power of converting starch into glycose by simple mixture. This property remains to a certain extent after the pancreas has exhausted its property of acting upon fat. The quantity of pancreas which before mixture with fat will convert about eight parts of starch into glycose, after saturation with fat, will still convert about two parts of starch into glycose.

Second object.—To discover a means of preserving the active principles of the pancreas in a form suitable for experiment in the laboratory, and for administration as a remedial agent.

The properties of the pancreas can be extracted from the tissue of the gland by means of water. This watery fluid putrefies very rapidly. It has an acid reaction, a deep yellow colour, coagulates largely by boiling, leaving the colour of the fluid unaltered. It may be precipitated by lead-solution, and decomposed again by sulphuretted hydrogen.

When this watery fluid is evaporated, it forms a syrupy extract, which is highly hygroscopic and very difficult to dry. With great care and trouble, however, it may be dried. For general purposes, the drying is greatly facilitated by adding a dry absorbing-powder, such as powdered malt. For experimental purposes, it may be used in its pure undried state of syrup extract, but must in that case be used fresh. In the dry state, either pure or mixed with malt-dust, it may be kept good for an indefinite length of time, if protected from moisture in a well-closed bottle. This extract of the pancreas, containing the active principles of the pancreas in the highest degree of efficiency, whether fluid or powdered, I call "pancreatine." This term is used only for convenience sake, and must in no way be understood to signify that the property possessed by it is single. All attempts to isolate the several properties of the pancreas into separate products have failed, no one of such products having been found to possess in perfection the property of acting upon fat in the manner described in this paper as peculiar to the pancreas. By the term "pancreatine," then, I desire to represent the entire properties of the pancreas extracted in a convenient form for keeping, for experiment, and for administration as a remedial agent.

One part of the pure pancreatine dried, without mixture with malt-dust, will digest at least sixteen parts of lard, and enable it to form a thick creamy emulsion, with about 100 parts of water. The emulsion thus formed presents in every respect the characters and qualities of the emulsion produced by the fresh pancreas already described. In this way, therefore, the active principles of the pancreas may be obtained and preserved in a form suitable for experiment in the laboratory and for administration as a remedial agent.

The third object of my investigations has especially occupied my attention in a long series of experiments at the Royal Hospital for Diseases of the Chest. Full details of these and of the results obtained have been published from time to time, during the last four years, in the medical journals; I shall not, therefore, occupy the time of the Society with any account of them in this paper.

Toxicology.

SNAKE POISONS.

THE publication of Dr. Shortt's offer of a prize for the discovery of an antidote to the poison of the cobra* has elicited some interesting facts respecting snake poisons.

Mr. FRANK BUCKLAND, in *Land and Water*, recounts some of his experiences relating to snakes in his usual lively manner. Being anxious some years ago to make the acquaintance of a living specimen of the then new British snake, *Coronella levis*, he engaged a professional viper-catcher to collect for him in the New Forest. The result of the search of this snake-finder, who was ordered to catch every uncommon snake he saw, was a bag containing about fifteen vipers and two coronellas. While the "professional" cunningly held one of the vipers, Mr. Buckland made certain observations and experiments, which must be described in his own words: "His mouth was wide open, and his tiny glass-like and needle-pointed fangs were at 'full cock,' like the lock of a shot gun. I then tickled his nose with a feather, and immediately learned something I did not know before. My irate friend moved his fangs alternately, first one becoming erect and then the other, and this in quick succession, just like a man sparring at the commencement of a fight; he never moved them both simultaneously, and no poison came out of the fangs. I then got a glass slide out of the microscope, and placed it in the viper's mouth. In an instant both fangs struck down upon it, and were immediately retracted parallel with the gum—their normal position when at rest. The fangs struck the glass with the quickness of a bee's sting, and seemed to attempt to fasten on it with a spiteful earnestness. Upon taking away the glass from between the viper's jaws, I was delighted to observe two drops of perfectly clear, translucent fluid resting upon it, each drop corresponding to the place where the tooth had struck. I at once placed these drops under the microscope, and then saw a wondrous sight. After a second or two, on a sudden, a crystal-like fibre shot across the field of vision, and then another and another, these slender lines crossing each other at various angles, reminding me of the general appearance of an aurora borealis while these crystals were actually forming, or of delicate frost crystals on a carriage or room window when there has been a sharp touch of frost set in. I was so delighted with the novel and unexpected phenomenon that I ran at once into the mess-room, and called my brother officers to look into the microscope; but though I could not have been absent from the room a minute, when we returned the coruscations and the crystallisations had entirely disappeared, and nothing but a pure fluid could be seen. The poison afterwards dried up on the glass, without the least appearance of crystals." With regard to the cobra poison, Mr. Buckland thinks it acts by "curdling" the blood which is arrested in the heart. He therefore counsels the free use of stimulants; and in regard to topical applications, asks what is the use of applying these to the external skin when the poison has been inserted by the fang into the deeper parts of the surface. If we wish to destroy the poison by antidotes, they must be injected deeply into the wound.

Dr. PETER HOOD, in the *Lancet*, recommends continuous and forced exercise as the only means of overcoming the action of the cobra poison on the great nervous centres of the body, in other words, a treatment analogous to that required for the prevention of death from poisoning by

* See January number, p. 20.

opium. He relates a case in which recovery took place under such treatment. A horse-keeper, in the service of the late Dr. Spilsbury, Physician-General of Calcutta, was bitten by a cobra. Dr. Spilsbury at the time was stationed at Jubulpoor, in Central India. The Doctor, on being informed of the accident, instantly ordered his horse to be harnessed and put to his buggy. He directed that the man's hands should be tied to the back of the gig; and when this was done, he mounted it, and drove the horse steadily for a distance of several miles, the man running behind. On arriving at Jubulpoor, the man's body was bathed in the most profuse perspiration, and he was almost powerless from excessive fatigue. Dr. Spilsbury then administered repeated doses, at regular intervals, of eau de luce, keeping the man in constant gentle exercise. After a few hours he was out of all danger, and recovered from the bite.

Mr. CHARLES J. SMITH, formerly Inspector-General of Hospitals, Madras Army, in a contribution to the *British Medical Journal*, refers to a case of cobra-poisoning in his practice, and to experiments subsequently performed on dogs, which seem to prove that liquor ammoniac, if given in sufficiently large and frequently-repeated doses, is a perfect antidote. He states that eau de luce (spiritus ammoniac succinatus) was looked upon as a specific when he went out to India, and that Croff's drops, which are said to contain ammonia, are used for the treatment of poisoning by snake bites at the Cape of Good Hope. He also says that tobacco kills snakes with extraordinary rapidity, and that the creatures are rarely, if ever, seen in tobacco-fields.

Chemistry.

ON THE ANALYSIS OF POTABLE WATERS.*

BY E. FRANKLAND, F.R.S., AND H. E. ARMSTRONG, ESQ.

ALTHOUGH the analysis of potable waters has received no inconsiderable amount of attention, the subject is surrounded with such formidable difficulties, that, at the time we undertook its investigation, it was generally regarded as one of the least satisfactory of analytical operations. The difficulties concentrate themselves chiefly upon the determination of the organic matters contained in all potable natural waters, and of the mineral compounds derived from the decomposition of these organic matters, viz., nitrons and nitric acids, and ammonia; the processes used for the estimation of the remaining mineral ingredients leaving little to be desired.

In the year 1856 Hofmann and Blyth† drew attention to the defects of the processes then in use, and showed that the loss experienced on ignition by the solid residue of a water could be made more nearly than before to represent the organic matters, by excluding from this loss ammoniacal salts, moisture, and hydrochloric acid, an improvement which they effected by the addition of a known weight of sodic carbonate to the water before evaporation. These chemists also pointed out the great desirability of determining the amount of nitrogen entering into the composition of the organic matters contained in waters, although they did not succeed in devising any process by which this could be accomplished. In 1864 Weltzien‡ described a new process for determining the amount of nitric acid in waters by the ignition of the water-residue with finely divided metallic copper. He also employed, for the first time, a process for the estimation of organic carbon, which consisted in acidulating the water with sulphuric acid, evaporating to dryness, and then igniting the residue with eupric oxide, as in an ultimate organic analysis. It is obvious, however, that this latter process could only make a distant approach to accuracy, because the sulphuric acid would not only expel volatile organic acids if present, but, by liberating nitrons and nitric acids, could scarcely fail to cause the oxidation and loss of other forms of organic matter. Never-

theless, Weltzien's memoir on the well waters of Carlsruhe is one of the most important contributions ever made to this branch of analysis.

In the following year W. A. Miller* gave an elaborate *résumé* of the processes which he considered to be most worthy of confidence, together with some important modifications and valuable suggestions; and in the same year Dr. Angus Smith† recommended and described certain modifications in the use of potassic permanganate in the examination of water for sanitary purposes.

In the monthly examination of waters supplied to London, one of us had frequently occasion to notice the serious imperfections which still attached themselves to the best processes of water analysis hitherto employed for the determination of the organic matter and of the products of its decomposition. Since the autumn of 1866 we have been occupied with the critical examination of these processes, and with attempts to place this branch of chemical analysis upon a more satisfactory basis. In laying the results of our inquiries before the Society, it will be most convenient first to discuss the merits of the processes in general use up to the commencement of our investigation, and then to describe the method of analysis which we now venture to recommend in dealing with the particular class of constituents above mentioned.

The following is a list of the determinations which are usually made in the so-called partial analysis of potable waters, and which have been submitted by us to examination.—

1. Estimation of total solid constituents.
2. Estimation of organic and other volatile matter.
3. Determination of amount of oxygen required to oxidise the organic matter.
4. Estimation of nitrous and nitric acids.
5. Estimation of ammonia.

We will examine these seriatim.

I. Examination of total Solid Constituents.—This operation is usually performed by evaporating a given volume of the water to apparent dryness, with a known weight of sodic carbonate, upon a steam bath; and, as the residue so obtained is generally employed for the determination of the organic and other volatile matters expelled on ignition, it is dried at 120°—130° C., before being weighed. This process involves two errors: in the first place the salts of ammonia are decomposed by the sodic carbonate, the ammoniac carbonate formed being expelled during evaporation; and, secondly, urea, if present in the water, is slowly decomposed during evaporation with sodic carbonate, ammoniac carbonate being expelled. The loss of weight in the solid residue arising from the latter cause is seen from the following determinations:

I. 1.505 grm. sodic carbonate, and .038 grm. urea, were dissolved in 1 litre of distilled water; the solution was evaporated on the steam-bath, and the residue dried at 100° C. The latter weighed 1.526 grm., showing a loss of .017 grm., or 44.7 per cent. of the urea employed.

II. .1 grm. sodic carbonate, and .05 grm. urea, on being similarly treated, left a residue which weighed .1205 grm., showing a loss of .0295 grm., or 59 per cent. of the urea present.

It is difficult, if not impossible, entirely to avoid this loss, but it is much lessened by omitting the sodic carbonate, and drying the residue at 100° C. By this modification of the process, the elements of water which would be expelled at 120°—130° C. are sometimes retained in the residue, but as such water is in chemical combination, it may be fairly said to belong to the solid constituents. It is only in the residues of waters containing much calcic and magnesian sulphates and chlorides that the weight of the elements of water so retained is considerable. Its small amount in the case of Thames water is seen from the following determinations made upon three different samples:—

	Solid residue dried at 100°	Solid residue dried at 120°—130° C.
100,000 parts of Thames water gave	27.02 pts.	26.54
100,000 " "	26.70 "	26.20
100,000 " "	26.10 "	26.02

* From *Journ. Chem. Society*, March, 1868.

† "Report to the President of the General Board of Health on the Metropolitan Water Supply," by Hofmann and Blyth.

‡ *Ann. Chem. u. Pharm.* cxxxii. 215.

* *Journ. Chem. Soc.*, vol. xviii. p. 117.

† "Estimation of Organic Matter in Water," by Angus Smith Ph.D., F.R.S., &c., 1865.

II. *Estimation of Organic and other Volatile Matter.*—This determination is effected by the gentle ignition in contact with air, of the solid residue obtained by evaporation and subsequent drying at 120° — 130° C., as above described. After being allowed to cool, the residuo is repeatedly treated with a saturated solution of carbonic anhydride in water, until, on being again dried at 120° — 130° , it ceases to gain weight. The loss in weight experienced by a water residuo on incineration, although now no longer regarded as an exact ponderal expression of the organic matter present in the original water, is yet considered by many chemists to afford at least an approximate indication of the amount of organic impurity. How far any reliance can be placed upon it in this respect may be judged of by the consideration of the following sources of error which we have found in the examination of this process. We have already shown that urca, when present in water contaminated with sewage, is partially dissipated during evaporation with sodic carbonate; thus a portion of the organic impurity of a water may be lost before the determination of the “organic and other volatile matter” is made, but this error is still further increased in the case of urca, and probably also in that of other nitrogenous organic compounds, by the impossibility of expelling the whole of the organic matter on ignition, as is seen from the following experiments:—

I. A water-residue consisting of .997 grm. sodic carbonate, and .0205 grm. urea, lost on ignition .003 grm.

II. A water residue consisting of .1542 gram. sodic carbonate, and .039 gram. urica, lost on ignition .011 gram.

III. A water-residue consisting of 1.505 gram sodic carbonate, and .038 gram. urea, lost on ignition .016 gram.

The results of these experiments may be thus expressed:—

Percentage of organic matter expelled	I.	II.	III.
on ignition	14.6	28.2	42.1
left in			
residue	85.4	71.8	57.9

It is probable that the organic matter left in the residue is in the form of sodic cyanate or cyanurate.

Another source of error which we have repeatedly encountered in the use of this process consists in a continued increase of weight by successive treatments of the incinerated residue with an aqueous solution of carbonic anhydride, until in some cases the weight of the incinerated residue even exceeds that which was observed before incineration. This remarkable phenomenon does not arise from any solid residue left by the solution of carbonic anhydride itself, because this source of fallacy was carefully eliminated, and moreover it occurs only with particular samples of water, but with these samples it is always observed when the determination is repeated. It occurs also in an equal degree when a solution of ammoniac carbonate is substituted for one of carbonic anhydride. It is difficult to account for this increase in weight, but, when it occurs, the determination of the loss by ignition becomes impossible, because the analyst does not know when to discontinue the treatment of the residue with solution of carbonic anhydride. These facts show how difficult it is to interpret the meaning of the loss on ignition experienced by a water-residue; it may arise entirely from organic matter, or it may be exclusively due to the dissipation of mineral ingredients. On the one hand, there may be much more organic matter in a water than is represented by the total loss on ignition; indeed, we have not unfrequently observed in the analysis of waters, greatly contaminated with sewage, that the loss on ignition has actually been considerably less than the weight of the carbon alone contained in the organic matters. On the other hand, this determination may indicate the presence of a considerable amount of organic matter in a water which is wholly free from it. All that can be inferred from the loss on ignition is that, when it is large, the water is probably contaminated with animal or vegetable organic matter, or has been previously in contact with decaying animal matters.

III. *Determination of amount of Oxygen necessary to Oxidize the Organic Matter.*—The uncertainty which surrounds the determination of the organic and other volatile matter by the ignition of the dried water-residue, has led to attempts being made to estimate indirectly, by means of potassic permanganate, the amount of organic matter present in the water before evaporation. Potassic permanganate, when dissolved in water, readily yields oxygen to many substances

capable of combining with this element ; thus, if it be added to water acidulated with sulphuric acid, and containing oxalic acid in solution, the latter is completely and rapidly converted into carbonic anhydride and water, at the expenso of oxygen derived from the permanganate ; and it is found that eight parts by weight of oxalic acid, in being thus oxidized, abstract almost exactly one part by weight of oxygen from the permanganate, the latter being converted into manganic sulphate. In undergoing this chemical change the rich violet colour of the solution of potassic permanganate, vanishes, and it is thus easy to ascertain, by the non-disappearance of the characteristic tint of the permanganate, when the oxidation of the oxalic acid is complete. Now, a similar disappearance of colour occurs when the solution of potassic permanganate is added to an acidulated sample of potable water containing organic matter, and it has been assumed that, as in the case of the oxalic acid, the organic matter contained in the water is completely oxidized by the permanganate, which is thus thought to indicate the amount of oxygen required for this purpose. Dr. Lettby has even employed this reaction for the estimation of the *actual weight* of organic matter contained in a known volume of water, on the assumption that every eight grains of organic matter contained in a sample of water, rob the permanganate solution of one grain of oxygen. Such a method of ascertaining the actual amount of organic matter in a water, or even the amount of oxygen required to convert this organic matter into its final products of oxidation, would be invaluable on account of the extreme facility with which it can be applied ; but, unfortunately, the further study of this process reveals its utter untrustworthiness.

By the addition of known weights of different organic substances to equal volumes of pure distilled water, the latter was artificially contaminated with a known proportion of each kind of organic matter. Every sample of water so contaminated was made to contain three parts of organic matter in 100,000. The amount of oxygen which this organic matter abstracted from the potassic permanganate was first carefully ascertained, and then the actual amount of organic matter present in the water was calculated, on the assumption that eight parts by weight of organic matter consumed one part by weight of oxygen from the permanganate. The same test was also applied to another sample of distilled water, from which all organic matter was carefully excluded, but to each 100,000 parts of which three parts of sodic nitrite were added. The importance of the last experiment will be evident when it is remembered how frequently nitrites are present in potable waters. The amount of oxygen consumed was determined for two different periods of time, viz.:—First, for a period, at the end of which, the acidulated and contaminated water remained tinted with permanganate for ten minutes after the addition of the latter; and secondly, for a period of six hours, during the whole of which time the permanganate was present in excess.

The results are contained in the following table, where they are compared with the known amount of organic matter present, and the known amount of oxygen, which that organic matter would require for its complete oxidation:—

1	2	3	4	5	6	7
Name of Substance, 5 parts of which were contained in 100,000 parts of water.	Oxygen absorbed in 10 minutes. (Experiment.)	Oxygen absorbed in 6 hours. (Experiment.)	Oxygen required to ox- idize organic matter. (Calculated.)	Amount of organic matter Present. (Calculated from Column No. 2.)	Amount of organic matter present. (Calculated from Column No. 3.)	Amount of organic matter actually present.
Gum Arabic	0'102	0'350	3'55	0'82	2'80	3'0
Cane Sugar	0'064	0'152	3'37	0'51	1'11	3'0
Starch	0'143	0'302	3'55	1'14	2'41	3'0
Gelatin	0'792	1'836	6'76	6'31	1'409	3'0
Creatin	0'080	0'172	6'59	0'64	1'38	3'0
Alcohol	0'093	0'164	6'26	0'74	1'31	3'0
Urea	0'402	0'119	6'10	0'74	0'95	3'0
Hippuric Acid	0'328	0'000	5'90	2'62	4'80	3'0
Oxalic Acid (crystalliz- ed)	3'747	3'750	3'8	2'998	3'000	3'0
Sodic Nitrite	6'910	6'913	0'00	5'521	5'530	0'0

From this table, it is seen that, of the nine kinds of organic matter operated upon, only one was completely oxidised by potassic permanganate, even after the lapse of six hours; whilst it will be remarked that urea, hippuric acid, and creatin—three organic substances likely to be present in water recently contaminated with sewage—suffer an oxidation which, even in the most favourable case, only reaches one-fiftieth of complete oxidation; whilst if the attempt be made to calculate the amount of these substances present in the water, from the quantity of oxygen so absorbed, instead of finding three parts of each in 100,000 of water, we obtain only .138 part of creatin, .095 part of urea, and .480 part of hippuric acid. On the other hand, the mineral salt, sodic nitrite, weight for weight, surpasses every form of organic matter experimented upon in the avidity with which it absorbs oxygen; and three parts of this inorganic substance in 100,000 of water would actually, by the mode of calculation above described, indicate no less than 5½ parts of organic matter. Thus it is evident, that for the estimation of the amount of organic matter in water, or the quantity of oxygen necessary to oxidise that organic matter, permanganate of potash is utterly untrustworthy. The fallacy of the permanganate test has often been suspected, but it was imagined that, although not to be relied on for quantitative estimations, yet its rapid decolouration afforded positive evidence of the presence of organic matter in actual putrescence, and consequently in its most dangerous condition. We fear, however, that, even for this subsidiary purpose, the permanganate is not sufficiently trustworthy. Fresh urine contains no organic matter in a state of putrescence, but, even when largely diluted, it decolourises the permanganate with almost the same rapidity as potassic nitrite. With all these defects, however, this re-agent may still be used in certain cases as a qualitative test where there is no opportunity for accurate analytical examination. Thus, if a clear and colourless water, decolourises much of the permanganate solution, the water ought to be rejected for domestic use as being of doubtful quality; for although such a water may be absolutely free from nitrogenous organic impurity, yet its decolourising action upon the permanganate would indicate with considerable certainty that it had been in contact with decaying animal matters. Should the water, however, instead of being colourless, be tinged of a yellow or brownish yellow colour, when viewed through a considerable stratum, as in a quart decanter, for instance, its capability of decolourising a considerable amount of permanganate solution ought not to be regarded with the same suspicion as a similar reaction with a colourless water, because the yellow tint of such waters is generally owing to the presence of peaty matter, which, though innocuous, has the power of decolourising potassic permanganate.

The depth of colour which a sample of water exhibits when viewed through a stratum some two feet in thickness, has also been regarded as an indication of the amount of organic matter contained therein. It appears to be so regarded for instance by Dr. Letheby, who thus speaks of the use of this test:—"The oxidizable organic matter is determined by a standard solution of permanganate of potash—the available oxygen of which is to the organic matter as 1 is to 8; and the results are controlled by the examination of the colour of the water when seen through a glass tube two feet in length, and two inches in diameter."*

The tinctorial power of many colouring matters is so great as to render them distinctly appreciable to the eye when their amount is far too minute to be detected gravimetrically; thus, a litre of water distinctly tinted with ink or magenta, contains an amount of either of these colouring matters, too small to be appreciated by the most delicate balance. The yellowish or brownish colour of water appears also to be of this character, for it may be removed completely by agitation with aluminic hydrate, and yet a considerable amount of organic matter is still left in the water. Thus, a sample of water which had been so treated, and which exhibited the blue-green tint of distilled water when viewed through a thick stratum, still contained .160 part of organic carbon in 100,000 parts. It is, therefore, evident that no

reliance can be placed upon colour as an indication of the amount of organic matter in waters, for although a dark-tinted water probably contains a considerable amount of organic matter, it by no means follows that a colourless water may not contain even a larger proportion. Thus, a sample of peaty water, possessing a decided brown tinge, contained but .256 part of organic carbon in 100,000 parts, whilst a sample of water from North Wales, which had been in contact with the fine mud of the stamping-engines of mines, was perfectly colourless, although it contained no less than .544 part of organic carbon in 100,000 parts.

IV. *Estimation of Nitrous and Nitric Acids.*—The best process hitherto employed for this estimation is that proposed by the late Dr. Pugh. It depends upon the conversion of stannous chloride into stannic chloride in the presence of free nitric acid, whilst the latter is transformed into ammonia. The application of this process to water analysis has been described by Miller.* If nitrites be also present, they may be converted into nitrates by the cautious addition of potassic permanganate to the water previously slightly acidified. The process is easy of execution, and extremely delicate; but unfortunately, as Messrs. Chapman and Schenk have shown, stannous chloride is converted into stannic chloride by many organic substances containing oxygen, such as starch, sugar, etc. The following experiments prove that this effect of starch and sugar takes place to such an extent as to render the process entirely untrustworthy.

I. 100 grm. starch was digested for twenty minutes in a sealed tube with 3 c.c. of stannous chloride solution, at a temperature of 170° C. Before digestion, 3 c.c. of the same solution of stannous chloride required 17.85 c.c. of a standard solution of dipotassic dichromate to oxidize it. After digestion, it required only 1.41 c.c. The oxidizing action of the starch was equivalent to that of .00375 grm. of N₂O₅.

II. 100 grm. sugar, similarly treated at 150° C., oxidized an amount of stannous chloride equivalent to 7.0 c.c. of the standard solution of dipotassic dichromate, corresponding to .007 grm. of N₂O₅.

III. 100 grm. starch, similarly treated at 150° C., oxidized an amount of stannous chloride equivalent to 4.2 c.c. of the standard dipotassic dichromate solution, corresponding to .0025 grm. of N₂O₅.

IV. 100 grm. starch, digested at 120° C., oxidized an amount of stannous chloride equivalent to 2.5 c.c. of the standard dipotassic dichromate solution, corresponding to .0025 grm. of N₂O₅.

V. The last experiment repeated, with .1 grm. of sugar instead of starch, at 120° C., gave results corresponding to .0958 grm. of N₂O₅.

Experiments II., III., IV., and V., were made in order to ascertain whether the oxidizing action of sugar and starch could not be prevented by operating at lower temperatures, but they show that these substances still oxidize very powerfully, even at a temperature below the minimum required, according to Pugh, for the performance of his reaction.

(To be continued.)

CHEMISTRY OF OIL PAINTS.†

HITHERTO but very little attention has ever been given to the above subject by our leading chemists, but a work has recently appeared, published by the celebrated Dutch chemist, Mulder, in which a vast amount of useful information on this point is imparted, and much of the mystery connected with the chemical action of the different paints is satisfactorily explained. The starting-point of his investigations was an inquiry as to the best material to protect iron from rust. The result has been his rejection of all oil paints as unlikely to answer the purpose, and his conclusion that coal tar contains the best materials for a protecting coat. The author very completely investigated the nature of paint, and the chemical changes involved in the drying of oils. As regards linseed oil, we are told that the essential constituent is "linolein," a compound of glycerin and linoleic acid. The latter body the author could not obtain

* Dr. Letheby's reports, on the Metropolitan Waters, to the Association of Medical Officers of Health.

* Journ. Chem. Soc., vol. xviii., p. 117.

† From the *Scientific American*, March 7.

quito pure, but he decides that its formula is $\text{HO}, \text{C}_{18}\text{H}_{32}\text{O}_2$.^{*} When exposed to air, linoleic acid rapidly oxidises, first to "linolic acid," a sticky body resembling turpentine. On longer exposure, "linoxyn" is produced. This is a tough, leathery substance, sharing, we may say, many of the properties of caoutchouc. It is soluble in the same menstrua, and can be vulcanised like india-rubber. It is manufactured in considerable quantities in this country (United States), and is the binding material used to consolidate emery wheels. It forms also the surface of linoleum cloth. According to Mulder, there are two linoxyns, the white and red; the white modification becomes red on exposure to 80° Centigrade, and the red again turns white on exposure to sunlight. The browning of white paint in dark places the author ascribes to the gradual change of white linoxyn into red. Oxidation does not end with the production of linoxyn. It still proceeds to the complete decay of the material, as is seen in very old paint.

One useful result of Mulder's labour is a simple process for preparing a good colourless drying oil. For this purpose it is only necessary to boil linseed oil for two hours with three per cent. of red lead, filter it, and then expose it to sunlight in large shallow vessels, frequently renewing the air above. Another result is a denial of the existence of albuminous and gummy matter in linseed oil, to which are ascribed the slowness of drying of unboiled oils. For these matters Mulder searched in vain, and at last came to the conclusion that they had no existence. Oxides and acetates of lead, he tells us, act as driers, not by precipitating albuminous matters, but by forming a little linoleate of lead, which rapidly oxidises and communicates its activity to the oil.

ON A WET METHOD OF REDUCING CHLORIDE OF SILVER.

BY DR. GRAEGER.†

THERE are many methods of reducing chloride of silver with which we are acquainted, but the majority of them are surrounded by difficulties of some kind or another; either silver recovered is not perfectly pure, or the manipulation of the process is attended with serious loss, or it is impossible for the whole of the chloride to be reduced at one operation. Now, as the reduction of chloride of silver is an operation which has very frequently to be performed, a method whereby these difficulties are overcome will be welcomed with pleasure; and so often have I felt the shortcomings of the methods at present employed, that it has always been my constant endeavour to discover a better and more serviceable mode of proceeding. In making my inquiries, I have always had in view the advisability of seeking for a wet method of reduction, as I regarded the same as the easiest manner of working, and involving less loss of material. The reduction of chloride of silver by means of iron, zinc, or copper in an acid liquid is well known to be an unsatisfactory method, as the product is always found to be contaminated to a more or less degree with the metals employed; the same result occurs if the chloride of silver is reduced by means of copper in an ammonia solution. At the same time, no mention has ever been made of the employment of zinc to reduce the chloride out of the ammonia solution. I find, however, that by using this metal, silver of a perfectly pure description may be obtained.

In order to reduce chloride of silver by means of zinc, it is first dissolved in ammonia, and placed in a bottle, and pure zinc in small excess, and in fragments of notable size (so that it may be easily separated after the process of reduction), is then added. The decomposition commences at once, and proceeds so rapidly, especially if the vessel is well agitated, that in the space of three hours, a quarter of a pound of chloride of silver may be reduced; the duration of the operation depends, however, of course, on the greater or less excess of zinc present in the solution. A certain excess of ammonia will likewise have the effect of accelerating the operation. At first, the precipitated silver assumes a light grey or dirty white colour, but towards the end it becomes

dark, grey or even black. A few drops of the ammoniacal solution should be examined in a test-tube from time to time, and precipitated with hydrochloric acid; the operation is at an end when no turbidity is apparent on the addition of the acid. When this is the case, the precipitate is allowed to settle down, and the clear liquid then poured off as completely as possible; the silver in the glass vessel is treated again and again with fresh water until all smell of ammonia has disappeared, and is then transferred to another bottle by means of a funnel, the tube of which has previously been stopped with a few fragments of glass, to prevent the pieces of zinc from passing through at the same time as the silver particles. The superabundant water is then decanted as completely as possible, and the precipitate treated with concentrated hydrochloric acid, in which it is allowed to digest until the dark grey colour has given place to one of a dirty white. If the silver contains much water, it is possible that it may not become white on a single treatment with the hydrochloric acid; in this case, the liquid must be again poured off, and a fresh quantity of acid added. By this means, the silver may always be obtained of a white colour, and when the operation has advanced thus far, the precipitate is repeatedly washed, until the water poured off is only very slightly acid. The silver is then collected on a filter, and well washed with distilled water; finally, a little dilute ammonia is poured on it, and it is again washed with water. This treatment is rendered necessary, in order to remove any minute quantity of chloride of silver which may have been formed by the action of the concentrated hydrochloric acid, the latter sometimes containing small quantities of free chlorine.

The silver produced in this manner is of a very pure description; at any rate, I have never been able to detect the presence in it of any other metal. When dissolved in nitric acid, and precipitated with hydrochloric acid, a fluid is obtained, which, when neutralized with carbonate of soda, does not become turbid by treatment either with ferrocyanide of potassium or alkaline carbonates. It assumes a brownish colour on the addition of sulphide of ammonium, owing to the presence of dissolved chloride of silver, but no precipitate is formed.

The expenditure of ammonia in the operation is, of course, not inconsiderable, but, as the greater portion of it may be recovered by distillation, the actual loss of the same is hardly appreciable. In working with large quantities of chloride of silver, economy may be exercised in the use of ammonia by reducing the chloride in several operations, so that the ammoniacal solution of chlorine and zinc, when freed from the silver, is again used to dissolve the chloride. This appears somewhat strange, but is evidently due, in part, to the presence of free ammonia, which exerts an action upon the chloride of silver only when the silver has been separated. Such a mode of proceeding would, however, occur only when manipulating with a considerable bulk of chloride of silver, for, in reducing small quantities, the necessary amount of water required to dissolve the chloride may easily be added.

In the same way, nitrate of silver dissolved in ammonia may also be reduced with zinc, perfectly pure silver being obtained; this result takes place even when the nitrate solution contains copper; as is very often the case. The copper, it is true, becomes reduced by the zinc in the ammoniacal solution, but only very slowly as compared with the silver, and hardly at all so long as a certain quantity of the latter is present in the solution. By this means, I have been enabled to separate the whole of the silver from old coins, containing but twenty-five per cent. of that metal. Every particle of silver must not, however, be separated; or, what is the same thing, the quantity of zinc added should be insufficient to precipitate the whole of it. The process possesses the particular advantage, that in order to separate copper from nitrate of silver, it is not necessary to transform the latter into chloride before it can be reduced. The finely-divided silver must, however, be treated in the manner described above, with concentrated hydrochloric acid, and afterwards well washed, to remove the particles of precipitated zinc. For the production of pure nitrate of silver, this method is especially recommended, as by its employment the tedious operations of washing the chloride of silver, and its subsequent reduction in crucibles are entirely dispensed with.

^{*} This agrees with the formula given in Watts's Dictionary, $\text{C}_{18}\text{H}_{32}\text{O}_2$.
[†] The modern atomic weights of carbon and oxygen are adopted.

[†] *Neues Jahrbuch für Pharmacie*. We abridge the translation given in the *Photographic News*.

ON THE PREPARATION OF UREA.

BY JOHN WILLIAMS, F.C.S.*

HAVING had occasion to prepare rather large quantities of Urea, I found that the result constantly fell considerably short of what I considered a satisfactory one. This led me to consider if the ordinary mode of preparation could not be improved upon.

The result of my experiments is, that cyanate of lead is better adapted for the purpose than the mixture of salt generally present in solution, when the usual process is adopted. I proceed in the following manner:—

I prepare cyanate of lead by fusing cyanide of potassium of the best commercial quality (containing about 90 per cent. of real cyanide) at a very low red heat, in a shallow iron vessel; red lead is added in the usual manner, by small quantities at a time with constant stirring, so as to prevent the temperature rising too much during the operation. I prefer cyanide of potassium to ferrocyanide for many reasons, but mainly because the temperature can be kept down to the lowest point.

The cooled and finely-powdered product is exhausted with successive portions of cold water, the liquid filtered, and nitrate of barium added. Carbonate of barium is thus precipitated. The mother-liquid, treated with nitrate of lead, yields pure cyanate of lead; this can be washed thoroughly, and dried at a gentle heat, and preserved for use. Unlike cyanate of potassium, it is a permanent salt, and could be produced at a moderate price, if required.

To prepare urea, it is simply necessary to digest with sufficient water at a gentle heat, equivalent quantities of cyanate of lead and sulphate of ammonium, filter and evaporate. I have found the result most satisfactory.

The compound ureas may, in like manner, be produced by substituting the sulphates of the compound ammonias for the ordinary sulphate of ammonium; the experiment has been tried and found successful.

Physics.

DIFFUSION OF LIQUIDS AND GASES.

SOME very elegant and simple methods of exhibiting the phenomena of diffusion are given by Herr Merz in a recent number of the *Journal für Praktische Chemie*. A portion of the shell of an egg having been removed by the action of hydrochloric acid, leaving the membrane exposed, the egg is to be suspended in water from the arm of a balance, a counterpoise being placed in the opposite scale. In about half an hour the weight of the egg has sensibly increased, as the position of the balance beam will show, in consequence of the passage of water through the membrane. If, however, alcohol be substituted for the water, and the weights re-adjusted, so as to bring the beam horizontal, it will soon commence to move in the opposite direction, showing that the egg has become lighter by the diffusion of water into the alcohol. The diffusion of vapour may be exhibited by tying a diaphragm of india-rubber—a portion of a small toy balloon will answer the purpose—over the mouth of a funnel, the other end being in communication, by means of an elastic tube, with a vessel of water. The funnel being inverted over a dish containing ether, which, however, the diaphragm is not to touch, the vapour of this fluid will pass rapidly into the funnel, the air being observed to escape in bubbles in the water at the small end. Remove now the vessel of ether, and the operation will be reversed, the vapour passing through the diaphragm into the atmosphere. In order to fill the vacuum thus created, the water will rise in the tube, the lower part of which should be of glass, to render this apparent, and the diaphragm will be curved inwards. These experiments are particularly instructive, and are within the reach of every one. The balance may be extemporised by means of a light bar of wood.

* Communicated to the Chemical Society.

Corner for Students.

The chemical formulae employed in this section are based upon the new system of atomic weights, unless the use of the older system is specially indicated. In the *British Pharmacopœia* the symbols corresponding to those adopted here are printed in heavy Clarendon type.

QUESTIONS.

ACIDUM NITRICUM, B.P.—This preparation is a definite hydrate. Represent its composition by a symbolic formula, taking HNO_3 as the symbol for an atom of nitric acid, and H_2O as the symbol for an atom of water.

ALUMEN, B.P.—In 1 pound of crystallised ammonia alum, what is the weight of aluminium? Give the weight in grains, with three decimal places.

ARGENTI NITRAS, B.P.—Give the weight of nitrate (in grains) obtainable from the 3 ounces of silver prescribed in the official form.

CALCIS CARBONAS PRÆCIP, B.P.—Calculate the weight of the product of the official form for precipitated calcic carbonate.

HYDRARGYRI CHLORIDA, B.P.—Calculate the percentages of mercury and chlorine in Hydrargyri Perchloridum and in Hydrargyri Subchloridum.

SPECIFIC GRAVITY.—1. A piece of white wax which weighs 100 grains in air has attached to it a piece of copper which weighs 776 grains in air and 687.6 grains in water; the weight of the united mass in water is 684.4 grains. Required the sp. gr. of the wax.

2. Determine the sp. gr. of ashwood from the following data: Weight of wood in air, 25.35 grs.; weight of a copper sinker in air, 11 grs.; weight of wood and sinker under water, 5.10 grs.; weight of sinker alone under water 9.77 grs.

ANSWERS.

PREPARATION OF OXYGEN (Feb. p. 97).—As the weight of 11.2 litres is 16 grammes, the weight of 100 litres is easily found:

$$11.2 : 100 :: 16 : x$$

$$\therefore x = \frac{100 \times 16}{11.2} = 142.857 \text{ grammes.}$$

Now the formula of potassic chlorate, KClO_3 , corresponds to the following statement of the composition of the salt:

Potassium	39
Chlorine	35.5
Oxygen	48
	122.5

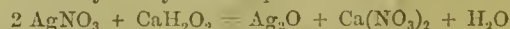
The weight of the salt required for the production of 142.857 grammes (or 100 litres) is therefore found by the proportion

$$48 : 142.857 :: 122.5 : x$$

$$\therefore x = \frac{142.857 \times 122.5}{48} = 364.583 \text{ grammes.}$$

[Answered correctly by Joseph Robinson, Chester-le-street; G. N.; S. S. Sanders, Salford; T. Wilson, Leeds. J. G. has misplaced the decimal point. J. Y. has evidently mistaken the weights referred to in the question.]

ARGENTI OXIDUM, B.P. (Feb. p. 97).—1. The reaction is represented by the symbolic equation.



Two molecules of argentic nitrate and one molecule of calcic hydrate give one molecule or argentic oxide, one of calcic nitrate and one of water.

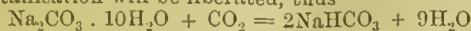
2. Substituting for the first and third groups of symbols the weights that they respectively represent (340 and 232), the data for calculating the product of the B.P. form are obtained. If 340 grains of nitrate give 232 of oxide, a half ounce (218.75 grains) ought to yield 149.265 grains.

[Both questions answered correctly by T. Wilson, Leeds; J. Gregory, Stockton-on-Tees; J. Young, Leicester; and with approximate correctness by R. S. Crossley, Grantham, and S. S. Sanders, Salford. A mistake in G. N.'s formula for calcic nitrate has led him astray in his calculations.]

HYDRARGYRI IODIDUM VIRIDE, B.P. (Feb. p. 97).—Following the directions of the B.P. which prescribes 278 grains of iodine to 1 ounce (437.5 grains) of mercury, 635.428 grains of iodine should be taken to convert 1,000 grains of mercury into the green iodide. The quantity required, as indicated by the formula HgI ($\text{Hg} = 200$, $\text{I} = 127$) is exactly 635 grains.

[Answered by *Harry Habgood*, Wells; *Joseph Robinson*, Chester-le-street; *J. Gregory*, Stockton-on-Tees; *T. Wilson*, Leeds; *R. S. Crossley*, Grantham; *J. Young*, Leicester; *G. N.* (according to incorrect data); *S. S. S.* (with an error of a few grains.)]

SODÆ BICARBONAS, B.P. (Feb. p. 97).—Crystallised sodic carbonate has the formula $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$, and if this salt be converted into the bicarbonate (hydro-sodic carbonate), by the action of carbonic anhydride, nine-tenths of its water of crystallisation will be liberated, thus



From the 2 pounds ordered in the official form, the quantity of water set free exceeds 18 ounces. The dried carbonate is therefore used together with the crystallised carbonate to avoid an inconvenient excess of water.

[Answers received from *J. Gregory*, *R. S. Crossley*, and *J. Young*, correct or partially correct.]

ACID SULPHURICUM DIL. B.P. (Feb. p. 97).—1,000 grain measures of the volumetric solution of soda correspond to 40 grains of sodic hydrate, NaHO , and require for neutralisation 40 grains of anhydrous sulphuric acid. Now, as 359 grains by weight of the diluted acid neutralise 1,000 grain measures of the test solution, these 359 grains correspond to 40 grains of SO_3 . But $359 : 40 :: 100 : 11.14$, therefore the true percentage of SO_3 in the diluted acid is 11.14, not 10.14, as erroneously stated in the B.P.

[Answered correctly by *J. Young*, Leicester. *J. Gregory* obtains the approximately correct result 11.2 by a troublesome calculation founded on the sp. gr. of the acid. *S. S. S.* and *R. S. C.* wrong.]

PREPARATION OF NITRIC ACID (Feb. p. 97).—The molecules of potassic and sodic nitrates, KNO_3 and NaNO_3 , correspond respectively to the weights 101 and 85. The quantity of the latter salt equivalent to 11222 grains of the former is therefore 9444 grains, for $101 : 85 :: 11222 : 9444$. This quantity of soda-salt-petre may accordingly be substituted for the stated quantity of potassic nitrate.

[Answered correctly by *T. Wilson*, Leeds; *J. Gregory*, Stockton-on-Tees; *J. Young*, Leicester; and *G. N. S. S. S.*, a few grains out.]

LIQ. FERRI PERCHLORIDI FORT. B.P. (Feb. p. 97).—The prescribed quantity of iron (2 oz. = 875 grains) corresponds to 2539 grains of ferric chloride, Fe_2Cl_6 . The quantitative test shows that this is the amount contained in the ten fluid ounces of the solution, for a fluid drachm gives 15.62 grains of ferric oxide Fe_2O_3 , corresponding to 31.73 grains of ferric chloride, and 31.73 grains per fluid drachm = 2539 grains in 10 fluid ounces.

[Answered correctly by *J. Gregory*, Stockton-on-Tees; and *S. S. Sanders*, Salford. The result obtained by *J. R.* is incorrect.]

SPECIFIC GRAVITY (Feb. p. 97).—1. Sp. gr. of acid = $922.5 \div 500 = 1.845$.

2. Sp. gr. of turpentine = $396 \div 500 = 0.792$.

3. Weight of gallon of rectified spirit = 58660 grains (= 8 lb. 6 oz. 35 gr.)

4. Sp. gr. of metal = $5.21 \div (5.21 - 4.13) = 4.824$.

5. Sp. gr. of sand. The 15 grammes of sand obviously occupy the bulk of 5.4 grammes of water, for $109.6 - 15 = 94.6$ (or 5.4 grammes less than the quantity of water which the bottle is capable of holding). The data for calculating the sp. gr. of the sand may therefore be set down as follows:—

$5.4 : 1.000 :: 15.0 : x$ (= 2.778 the sp. gr. of the sand).

6. Height of water barometer. $1.0 : 13.6 :: 30 : x$ (= 408 inches, or 34 feet.)

[Answered by *H. Habgood*, Wells; *I. Tansley*, Kingsland-road; *J. Robinson*, Chester-le-street; *J. Gregory*, Stockton-on-Tees; *J. Young*, Leicester; *T. Wilson*, Leeds; *R. S. Crossley*, Grantham; *S. S. Sanders*, Salford; *G. N.* The answers of the last three students are not all correct.]



OUR LIBRARY TABLE.

Recollections of the Paris Exhibition of 1867. By *EUGENE RIMMEL*. Pp. 340. 160 Illustrations. Chapman and Hall.

This pretty table-book will pleasantly remind the English visitors to the late Paris Exhibition of its most striking features. Mr. Rimmel, as Assistant Commissioner, was compelled to examine the contents of the great building on the Champ de Mars in a systematic manner, and he imparts the knowledge thus acquired in his chatty way. We shall review the book in a future number.

Rain: How, When, Where, and Why it is Measured. By *G. J. SYMONS*, F.M.S. Pp. 88. With numerous Illustrations. Price 2s. Stanford.

This popular account of Rainfall Investigations, by a gentleman who may be fairly described as "the Clerk of the Weather," should be within the reach of every one who keeps a rain-gauge, and may be profitably studied by all who desire to know how, when, where, and why rain is measured.

Board of Works for the Limehouse District. Report of the Medical Officer of Health for the Year ending Lady-day, 1867.

In this elaborate report, Mr. Orton fully explains his views on the Cholera Epidemic in the East of London in 1866. He will not admit that the alleged foul water of the East London Company had anything to do with the cholera "explosion," but contends that the primary cause of the outbreak was atmospheric, and that the extraordinary mortality in the East of London was mainly attributable to the accumulations of filth found there.

Watts's Dictionary of Chemistry. Part XLIV. Types—Water. Price 2s. 6d. Longmans.

The great work, edited by Mr. Henry Watts, F.R.S., is coming to an end, and will, we understand, be completed on the publication of the next part. The book is in itself a library of reference, and we strongly advise our scientific readers, who have not subscribed to it, to begin putting by money for purchasing the five volumes. The present part contains important articles on urea, uric acid, urine, and valeric acid, subjects particularly interesting to pharmaceutical chemists and physicians.



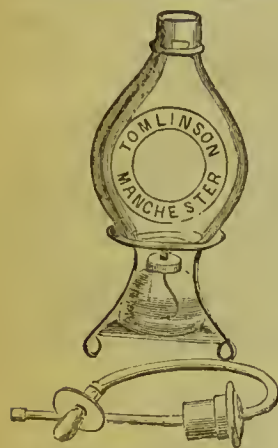
MOUTARDE EN FEUILLES DE RIGOLLET.

WE quote from the Analytical Records of the *Lancet* the following note on a novel sinapism:—"Although the preparation of an ordinary mustard poultice is not a very troublesome proceeding, yet it is sufficiently so in many cases to deter invalids from having recourse to the slighter ailments to this, the most useful of all mild external applications. Add to the trouble the uncertainty of the action of a mustard poultice from the inferior quality of the mustard frequently used, and then it will be widely acknowledged that if any means can be devised whereby some of the trouble and uncertainty are lessened, a desirable object will have been attained. Some proposed substitutes for a mustard poultice are not to be relied upon, since their activity

depends mainly upon capsicum, and not the active principles of mustard-seed; but in the mustard-leaves of M. de Rigollet we have, it is believed, a reliable and very ready means of obtaining the epispastic effects of mustard. These leaves are so smooth and flexible on the outside as to convey the notion that the material entering into their composition consists of leather. This is not the case, however; while the interior of the leaves is covered with a thickish layer of a material which on analysis by the microscope, and by the taste, one has no difficulty in declaring to be the flour of black mustard-seed, with a considerable proportion of husk. The agent is M. Menier, Henrietta-street, Covent-garden."

TOMLINSON'S NURSERY LIGHT AND FEEDING-BOTTLE STAND.

The simple oil lamp and bottle stand introduced by Mr. Tomlinson, of Manchester, are intended for the use of those poor mothers who cannot afford the cost of the more elaborate nursery lamps and food warmers.



The lamp consists of a strong glass hemispherical bottle with a metallic wick-holder, and the stand is a simple tripod formed of wire and tinned plate. The feeding-bottle, half filled with food, is placed upon the stand, and if a little cold milk or farinaceous food be kept at hand to cool the heated liquid, baby's nocturnal demands can be supplied with little trouble; while the lamp serves the purpose of an ordinary night-light. We think the stand might be improved by

riveting the wires to the bottle table instead of soldering them into holes. Rape or olive oil is used in the lamp. The bottles sold by Mr. Tomlinson are carefully annealed, and may be heated without risk of fracture.



PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

EVENING MEETING, MARCH 4.

The Vice-President in the Chair.

Professor BENTLEY made a few remarks on some specimens of drugs which had been presented to the Museum by P. L. Simmonds, Esq.

Professor ATTFIELD read a paper giving the results of an Analysis of the Water of a Remarkable Medicinal Spring in Jamaica. A sample of the water had been sent to him from Jamaica in May, 1867, with the statement that thousands of negroes had been flocking to the spring, under the conviction that the water was a panacea for all human ailments. The water was clear and inodorous, with a taste strongly saline. Its specific gravity was 1026.6, its buoyancy being consequently equal to that of an average specimen of sea-water. The quantity of solid matter dissolved in the water was 2.493½ grains to the imperial gallon, or nearly 3½ per cent. by weight. Spring-water containing so large a quantity of mineral matter has, probably, never before been observed. About three-fifths of the solid matter was chloride of calcium, the other two-fifths being chloride of sodium, with a

small quantity of chloride of ammonium. The exact proportions were as follows:—

Chloride of calcium	2.10100
Chloride of sodium	1.36500
Chloride of ammonium	.00338
Water	96.53062
	100.00000

Roughly speaking, 1 gallon contained 3½ ounces of chloride of calcium, 2 ounces of common salt, and 2½ grains of chloride of ammonium. A full draught of the water, half a pint, would, therefore, contain nearly a quarter of an ounce of chloride of calcium (five times the full official dose), about half that quantity of chloride of sodium, and an insignificant amount of chloride of ammonium. This composition was remarkable, not only on account of the abnormal proportions of the chlorides present, but also on account of the absence of sulphates, nitrates, carbonates, potassium and magnesium salts, and other compounds met with in spring-waters. The gases dissolved in the Jamaica water were small in amount, and had, doubtless, been absorbed from the air. The author concluded that the medicinal qualities of the water were chiefly due to the chloride of calcium, and referred to Pereira's statement of the therapeutic action of this substance, which received singular confirmation from the practices of the negroes in Jamaica in regard to the spring. According to Pereira, chloride of calcium, in small doses, promoted the secretion of mucus, urine and perspiration; and glandular and other swellings had diminished, softened, and ultimately disappeared under its use. In larger doses, it excited nausea, vomiting, and purging. It had been employed in scrofulous affections, attended with glandular enlargements, and had been found most efficacious in the treatment of tuberculous diseases of the abdomen. The effect of the chloride of sodium in the spring would also be alterative and stimulative of the absorbents. Apparently, therefore, the general physiological action of the Jamaica water would, in small doses, somewhat resemble that of the celebrated saline waters of Leamington and Cheltenham. The water might shortly be described as strongly calcareous and saline.

An interesting account of the spring obtained by Professor Attfield from the proprietors of the estate on which it is situated was included in the paper. According to this account, it has been known for many years; but its alleged miraculous powers in chronic pains of the joints, glandular swellings, and scrofulous affections attracted little attention before November, 1866. It is known as the Windsor Spring, and is situated in the parish of St. Ann's. It is sixty-eight feet above the level of the sea, and seventy-six chains from the shore. It flows with tolerable regularity, yielding about seventy gallons per hour.

Mr. C. H. Wood, F.C.S., read a paper on Syrup of Hypophosphite of Iron.

The author referred to the usual method given for the preparation of this syrup—namely, to dissolve carbonate of iron in hypophosphorous acid, and pointed out its inconveniences and objections. He then gave the following as a rapid and easy process for the production of the syrup at the time it is required:—Dissolve 480 grs. of granulated sulphate of iron in 1½ fl. oz. of dilute phosphoric acid, and 1 oz. of distilled water; rub 326 grs. of pure hypophosphite of lime of commerce to fine powder, and pour on it the solution of sulphate of iron; triturate for a few minutes, and transfer the mixture to a piece of damped calico; squeeze out the liquid, filter it through white paper, and mix it with seven times its volume of simple syrup. This operation only occupies about a quarter of an hour, and it yields a syrup, containing 2 grs. of hypophosphite of iron ($\text{Fe}(\text{PH}_2\text{O}_2)_2$) in a fluid drachm, contaminated only by a minute quantity of sulphate of lime. The phosphoric acid is added to prevent a precipitate which otherwise forms after a slight exposure to air.

Professor ATTFIELD described a laboratory experiment, relating to Magnetic Hydrate of Iron (*Ferri Oxidum Magneticum*, B.P.). He added an alkali to a solution of ferrous and ferric sulphate, in molecular proportions, and obtained the usual black hydrate of iron, having the well-known property of being attracted by a magnet even when the latter was simply immersed in the mixture. He then precipitated

appropriate quantities of ferric and ferrous hydrates in separate vessels: neither precipitate was affected by the magnet. The contents of these two vessels were then well mixed, when a hydrate resulted, which at first was not at all magnetic, feebly so after ten minutes; its attractability increasing, he said, until, after twenty-four hours, it appeared to be more strongly attracted than the black hydrate made in the usual way.

This experiment seemed to indicate, first, that in making magnetic hydrate of iron, for use in medicine, fuel need not be wasted in obtaining ferric sulphate, entirely free from the nitric acid used in its preparation, for the ferric solution could be poured into the alkali before the ferrous, any nitric acid thus becoming neutralised and prevented from oxidizing the ferrous salt. Secondly, it afforded confirmation, were any needed, of the belief that magnetic hydrate was a compound, and not a mere mixture of ferrous and ferric hydrates. Thirdly, it was a good illustration of the influence of time on chemical change.

UNITED SOCIETY OF CHEMISTS AND DRUGGISTS.

MEETING OF EXECUTIVE COMMITTEE, MARCH 5.

Present.—The President in the chair, Messrs. Mathews, (Past-President,) Pass, Anderson, Heppell, Betty, Thomas, Buott, jun., White, Mellin, Padman, Vinceer, Burton, Beere, Myers, Nunn, Fenton, Crotch. Amongst the country delegates and members specially appointed to attend the meeting were Messrs. Hornby and Huddleston, of Sheffield; Gates, Burn, and Bell, of Hull; C. S. Smith, of Cirencester; Hodgkinson, of Coventry; Thurland, of Oxford; Cheverton, of Tunbridge Wells; Unthank, of Brighton; Griffin, of Bolton; Mereer, of Hanley; Barnaby, of Rochester; Stannard of Croydon; Gunn, of Harrow, and other gentlemen.

The minutes of the former meeting being brought before the notice of the Committee, an animated discussion took place, whether they should be read *in extenso* or not. As the discussion was likely to be a prolonged one,

Mr. BUOTT, JUN., said that as so many gentlemen were present who had come a long distance, in order to discuss the merits of the proposed Bill to amend the Pharmacy Act, it would be a great waste of time to let matters of form divert their attention from the real business of the meeting. He would, therefore, move that the confirmation of the minutes and all other business not connected with the consideration of the Bill be adjourned *sine die*, which, upon being seconded by Mr. PASS, was resolved unanimously.

The SECRETARY announced that since their last meeting the various district associations had been furnished with copies of the Bill, and that special meetings had been held to discuss the various clauses. Communications had been received in consequence from Manchester, Bolton, Stockport, Hanley, St. Helens, Birmingham, Halifax, Scarborough, Burton-on-Trent, Acreington, Goole, Sheffield, Newcastle-on-Tyne, Oxford, Reading, Eastbourne, Rye, Brighton, Sunderland, Peterborough, Hull, Dewsbury, Bishop Auckland, Hersford, Bistol, Newport, Isle of Wight, Coventry, Bridgewater, Hockley, Wolverhampton, Cirencester, North Shields, Rochdale, Burnley, Taunton, Tavistock, Truro, Liverpool, Bilston, Ashton-under-Lyme, etc.

These communications having been read, a vote of thanks was unanimously accorded to the different district associations for their suggestions, and also to the delegates who were present to assist by their counsel.

Before proceeding to read the draft of the proposed Pharmacy Bill as revised by the Council of the Pharmaceutical Society,

Mr. BUOTT, JUN., thought it would assist towards a harmonious consultation if all the gentlemen present could agree to one common starting point, as it would tend to show that they all were of one mind as to the principle, the only difference being that of detail. He, therefore, proposed the Bill as now drafted be adopted as a basis for legislation, subject to any amended clauses that might hereafter be agreed upon; and the support of the trade be invited, in order to secure its speedy passage through Parliament. The proposition being seconded by Mr. BETTY, was unanimously carried.

The PRESIDENT then called upon the Secretary to read the Bill.

The preamble having been agreed to at the former meeting,

Mr. BURN moved, and Mr. ANDERSON seconded that the 1st clause be agreed to, which was carried.

Mr. HEPPELL moved, and Mr. HUDDLESTON seconded that the 2nd clause be agreed to, which was carried.

With reference to Clauses 3, 4, and 5, it was proposed by Mr. ANDERSON, and seconded by Mr. HEPPELL, that they should be agreed to, with the exception that in Clause 4, line 7, that the word "*D* and" be omitted, which was duly carried.

On Clause 6 being read, it was suggested by Mr. BUOTT, jun., that the attention of the Council of the Pharmaceutical Society be drawn to this clause, in order that it might be amended, should it be found that the present Pharmacy Act gives no power to them to promote Local Boards of Examination if found necessary. This recommendation, upon being seconded by Mr. BEERE, was agreed to.

Clause 7 was moved by Mr. HUDDLESTON, and seconded by Mr. BELL, and agreed to.

Clause 8 was reserved to the end of the debate.

Clause 9 was moved by Mr. BETTY, and seconded by Mr. MYERS, and agreed to.

Clause 10.—It was proposed by the PRESIDENT, and seconded by Mr. HEPPELL, that two letters he sent instead of one—"one at six months, and the subsequent one at three months later date, both letters to be registered."

The clause thus altered was agreed to.

Clause 11 was moved by Mr. BETTY, seconded by Mr. GATES, and agreed to.

Clause 12 was moved by Mr. HEPPELL, and seconded by Mr. GRIFFIN, and agreed to.

Clause 13 was moved by Mr. MERCER, seconded by Mr. BELL, and agreed to.

Clause 14 was moved by Mr. CROTCH, seconded by Mr. PASS, and agreed to.

Clause 15 was moved by Mr. STANNARD, seconded by Mr. MELLIN, and agreed to.

Clause 16 was moved by Mr. THOMAS, seconded by Mr. BURTON, and agreed to.

Clause 17 was moved by Mr. BEERE, seconded by Mr. UNTHANK, and agreed to.

Clause 18 was moved by Mr. BELL, seconded by Mr. MATTHEWS, and agreed to.

Clause 19.—This clause was productive of a very animated discussion, and it was finally closed by the following resolutions being duly carried:—

Moved by Mr. GATES, and seconded by Mr. ANDERSON, that the word "*entitled*" be substituted for the word "*eligible*."

Moved by the PRESIDENT, and seconded by Mr. HEPPELL, that in Clause 19, in lines 11 and 12, that the words "*according to the bye-laws thereof*" be expunged, and that the following be added: "*And such associate shall upon entering into business be a chemist and druggist within the meaning of this Act, in accordance with Clause 3.*"

Clause 20 was moved by Mr. MATTHEWS, seconded by Mr. BELL, and carried.

Clause 21, on the motion of Mr. GRIFFIN, seconded by Mr. CHEVERTON, was subject to the verbal alteration necessary to place it in conformity with the amendments duly carried.

Clause 22 was moved by Mr. BETTY, seconded by Mr. PASS, and agreed to.

Clause 23, moved by Mr. CROTCH, seconded by Mr. BURNS, was agreed to.

Clause 24, moved by Mr. BEERE, seconded by Mr. MELLIN, was agreed to.

Schedule A.—On the proposition of Mr. HUDDLESTON, seconded by Mr. MYERS, was adopted.

Schedule B.—Moved by Mr. SMITH, seconded by Mr. MELLIN, was adopted.

Schedule C.—Moved by Mr. MERCER, seconded by Mr. STANNARD, was adopted.

Schedule D.—On the motion of Mr. GRIFFIN, seconded by Mr. PASS, it was proposed that the words "*or Magistrate*" be inserted after the words "*Medical practitioner*," which alteration was agreed to.

In Schedule E.—It was proposed by Mr. ANDERSON, seconded by Mr. GUNN, that after the words "*Pharmaceutical Chemist*" in line seven, that the words "*or as dis-*"

penser to a recognised Medical Institution" be added, which alteration was carried.

It was also proposed by Mr. ANDERSON, seconded by Mr. HEPPELL, and carried, that in line 11, the words "or Magistrate" be added, and that the word "or" should commence lines 12 and 13.

On the discussion of clause 8, with reference to the appointment of Registrar being resumed,

Mr. ANDERSON said that the Pharmaceutical Society had very properly provided for their Registrar by securing his future position in the proposed Bill. The "United Society" had a Registrar, on whose behalf they had at Annual Meetings and on many occasions pledged themselves, that when the present stage of proceedings had been arrived at, they would make it a *sine qua non* that he should be appointed to some honourable post not necessarily in competition with the present Registrar of the Pharmaceutical Society, but as a recognition of his great services in promoting the Bill. They had, as a society, undertaken to do this, and it now lay in their power to honestly fulfil their promise. By the amended Pharmacy Bill, the Pharmaceutical Society would be placed in the receipt of an additional income of some thousands a year for the future registration and examination fees. He should therefore propose that a compensation clause be inserted in the Bill on behalf of their Registrar. The Pharmaceutical Society could not with any grace, oppose it, as the same Bill would enable them to behave liberally towards their own officer. In supporting this, he begged gentlemen present to bring to their remembrance the services of Mr. BUOTT. Let not the zeal, the fidelity, the persistent labour which had earned the rich boon of this Bill for the trade be forgotten. Had they not had the services of their Secretary, he had no hesitation in saying that they would have been as far off the Bill as ever. Mr. BUOTT had advocated their cause throughout the length and breadth of the country. He had steadily kept in view their object, and no amount of labour, time, or trouble, had been spared by him to promote it. Again, and again, the battle would have been lost but for his unconquerable determination. By his labours they had been provided with followers, means, and influence as a Society, and so unselfish had he been that it was placed upon record by a Sub-Committee specially appointed to examine the question, that out of the small salary they had been willing to vote him that he had dedicated during the years of his service, the sum of not less than £1000 of unpaid salary due to him, rather than cripple their means. They owed an allegiance to these past services, and by the remembrance of them, the consideration of his advanced years, and the great sorrow that had come upon him, he called upon them to fulfil their promise, and not to desert him, who had made the future prosperity of the trade the crowning success of his life. He should move that a compensation clause at least, equalling in amount to what they owed him for salary for past services, be inserted in the Bill.

Mr. BETTY said that he was sorry that he could not recommend this plan to be adopted, the more so as he thoroughly agreed with all that had been said with reference to Mr. BUOTT's services. He thought that it would tend to weaken the friendly relation between the two societies, and if a Compensation Fund were at once started, he knew that it would be cordially supported by Pharmaceutical members. As a friend of Mr. Buott's, he would urge this to be adopted, and if so, he should at once commence operations, and himself give ten guineas towards a Compensation Fund. He was quite certain that Mr. BUOTT's interests would thus be better furthered.

Mr. MATTHEWS said that he concurred with all that Mr. BETTY had urged, and that if a Compensation Fund on Mr. BUOTT's behalf were started, he should do all he could to support it.

The PRESIDENT said that if the Compensation Fund were adopted, he should double his subscription, and that he felt quite sure that Sheffield would give it a cordial support. He should ask every gentleman in the room to follow his example.

Mr. GRIFFIN said that the Compensation Fund would meet with every support at Bolton. He should subscribe five guineas.

Mr. BELL, of Hull, said that he should give two guineas towards it, and after some further debate, it was agreed to immediately commence a Compensation Fund.

Mr. ANDERSON then moved, and Mr. GRIFFIN seconded, that

"The Executive Committee of the United Society of Chemists and Druggists having considered the clauses of the amended Pharmacy Bill, and found that certain alterations are necessary, they would ask for a conference with the Council of the Pharmaceutical Society for the purpose of finally agreeing to the Bill and promoting its passage through the Houses of Parliament," which motion was unanimously carried.

A resolution moved by Mr. ANDERSON, seconded by Mr. HEPPELL,

"That the SECRETARY be instructed to furnish as early as convenient to the Council of the Pharmaceutical Society information of the proposed amendments, asking them to fix an early day for the conference," was also adopted.

A vote of thanks to the PRESIDENT closed the proceedings.

C. BUOTT, Secretary.

CHEMICAL SOCIETY.

RECEPTION BY THE PRESIDENT AT WILLIS'S ROOMS.

The President of the Chemical Society, Dr. Warren de la Rue, F.R.S., entertained a large and brilliant assembly at Willis's Rooms on the evening of Wednesday last. Cards of invitation had been issued to the Fellows, and to numerous "representative men" connected with science, art, or literature, and the result was a gathering which showed the host's great power of attraction. Among the many eminent men present, we noticed the following chemists and physicists:—The Master of the Mint, Thomas Graham, F.R.S.; Professor Williamson, F.R.S., University College, London; Professor Frankland, F.R.S., and Professor Tyndall, F.R.S., Royal Institution; Professor Odling, F.R.S., St. Bartholomew's; Professor W. Allen Miller, F.R.S., King's College; Professor Atkinson, F.R.S., Sandhurst; Professor Wauklyn, London Institution; Professor Able, F.R.S., Woolwich; Professor Atfield, Pharmaceutical Society; Dr. Hugo Muller, F.R.S.; Dr. Russell, F.R.S.; Dr. Gladstone, F.R.S.; Greville Williams, Esq., F.R.S.; Henry Watts, Esq., F.R.S.; David Forbes, Esq., F.R.S.; and William Crookes, Esq., F.R.S. We were informed that Professor Kolbe, of Leipzig, one of the leading Continental chemists was also present.

The articles exhibited were too numerous to be described within the limits assigned to this notice, which is necessarily written on the eve of publication. Some idea of the extent and importance of the collection may be gained from the following list:—

Microscopes; polariscope; Ackland's optometer; telescope; artificial tonmalines; dividing engine, shown in action; spectroscope; induction coil and Giessler's tubes; stereoscope; Ackland's alcohol thermometers; thermometers; divided instruments. Messrs. Horne and Thornthwaite.—Picture, by Gainsborough, and bronze bull. Thomas Woolner, Esq.—Battery of silver and zinc, with chloride of silver for the electrolyte. The President and Dr. Hugo Muller, F.R.S.—Philosophical apparatus. Mr. Charles Heisch.—Electric resistance measurer and resistance thermometer. C. W. Siemens, Esq., F.R.S.—Dr. Russell's apparatus for the analysis of gases; miscellaneous modern chemical apparatus. Messrs. John J. Griffin and Sons.—Rare Chemicals. Messrs. Hopkin and Williams. New form of reflecting goniometer; specimen of touracine; spectrum of touracine in the microspectroscope, kindly prepared by Professor Church. Mr. John Browning. Spheres, prisms, and large specimens of Iceland spar; apparatus for producing ozone; polarising saccharometer; colour-meter for comparing the colours of liquids. Mr. William Ladd.—Passenger, guard, and driver intercommunication. C. V. Walker, Esq., F.R.S.—Coal-tar products. Chambers Nicholson, Esq.—Odophone, or gamut of odours; perfume fountain. Messrs. Piesse and Lubin.—Dialytic apparatus. The Master of the Mint.—Chromo-lithographs. Messrs. M. and N. Hankart.—Pictures by J. M. W. Turner, Clarkson Stausfield, etc. E. W. Cooke, Esq., R.A., F.R.S.—Ancient pharmacy: engravings and portraits. Joseph Ince, Esq., F.C.S.—Three paintings by J. M. W. Turner, R.A. D. J. Pownd, Esq.—The new metal thallium (discovered by

means of spectrum analysis by W. Crookes, Esq., F.R.S.), and a large series of its salts, and other rare chemicals, prepared by Messrs. Hopkin and Williams.—Philosophical Instruments. Messrs. Murray and Heath—Spectroscope with hollow wedge; photographs of fluorescent substances. Dr. J. H. Gladstone, F.R.S.—Polarising Kaleidoscope. Professor Pepper, F.C.S.—The Sprengel mercury pump. Dr. Odling, F.R.S.—Carbolic Acid. Charles Lowe, Esq., F.C.S.—Large crystals. Peter Spence, Esq., F.C.S.—Model for regulating street traffic: Cab-lamp. J. P. Knight, Esq.—Japanese collection. Joseph Beck, Esq.—Anemograph, barograph, and thermograph, as adopted by the Kew Committee; achromatic stereoscopes and microscopes. Messrs. R. and J. Beck.—Gas perfecter. Mr. John Scholl.—Chilled shell, Palliser's 7-inch; section of Palliser shot, chilled and sand-cast; boxer shrapnell shell, for rifled ordnance (section with entire bullets); Abyssinian 7-pounder double shell, whole and in section; Armstrong 12-pounder segment shell, in section; recovered 12-pounder Armstrong shot, showing the rifling; Boxer 10-inch parachute light; Hale's 9-pounder rocket and tube; case of time and percussion fuses (including copper, quill, and electric tubes); Boxer cartridges, whole and in section, and a selection of other small-arm cartridges; Snider breech-loading rifle; Armstrong shell, with blistered lead coating; Australian meteorite, in section, with etched surface; illustration of metal work cut with the band saw, as applied in the royal carriage department; shell made in imitation of a piece of coal, as used by Confederate cruisers when in danger of capture; photographs and photolithographs; Prussian Needle-gun. From the Laboratory, Royal Arsenal Woolwich.—Ancient arms, from the R.M. Repository, Woolwich. General Lefroy, R.A., F.R.S.—Flexible stone from Delhi; original manuscript of Gray's elegy. —Francis Wrightson, Esq.—Paintings. W. H. Ince, Esq.—Enamels, from photographs, burnt in on metal, by F. Joubert's process. F. Joubert, Esq.—Curious and rare minerals. Messrs. Johnson and Matthey.—Phenol, or carbolic acid, and its products; aniline colours and rare chemical products. Wm. Henry Perkin, Esq., F.R.S.—Apparatus for investigating the intensity of solar heat. Mr. Casella.—Microscopes. Messrs. Powell and Lealand.—Meteorological and optical instruments. Messrs. Negretti and Zambra.

One of the most noteworthy contributions was the compact Chloride of Silver Battery exhibited by the President and Dr. Hugo Muller. Its novelty consists in the use of chloride of silver fused around a thin silver wire as the negative element, the positive plate being composed of a small rod of zinc which need not be amalgamated. The size of the whole arrangement does not exceed three inches in height, and, with a battery of ten cells excited with salt water, a rapid current of mixed oxygen and hydrogen gases is evolved from acidulated water. When in use the salt brine becomes gradually charged with chloride of zinc, which tends to increase the energy of the battery, and the whole arrangement continues in working order until metallic zinc begins to be deposited on the negative element, when the exciting liquid must be changed. For convenience in putting into action the whole series at once, the round bars of zinc and chloride of silver are fastened at the top to a wooden or ebonite frame which is made to slide upon glass uprights, and, when immersed, the white chloride is, of course, undergoing a slow reduction to metallic silver, which permeates the mass much after the fashion of the strings of virgin silver that are not unfrequently met with in nature, and are believed to have a similar galvanic origin. The battery shown in action on Wednesday evening consisted of two hundred cells.

The great blocks of Coal Tar Products, exhibited by Chambers Nicholson, Esq., and the huge crystals of different Alums, shown by Peter Spence, Esq., were the lions of the chemical display.

LAW AND POLICE.

BETTS'S PATENT AGAIN.—BETTS V. NEILSON AND OTHERS.

The Lord Chancellor has delivered a judgment in this case. The bill was filed to restrain the defendants from using and selling in England capsules made of a material or combination of lead and tin, discovered and invented by the

plaintiff, and it alleged that the firm of J. and R. Tennant, brewers at Glasgow, and manufacturers and exporters of bottled beer in large quantities, had been in the habit of covering their bottles with capsules of the same construction and material as those manufactured and patented by Mr. Betts, and of sending such bottles to their agents at Liverpool and London, for trans-shipment to India and China. The defendants contested the validity of the patent, on the ground of anticipation by prior use of the invention under a patent taken out by one Dobbs, in 1804; and also that, even assuming the validity of the patent, and the infringement of it by the capsules used by them, the mere trans-shipment of the cargo at Liverpool or London from the Glasgow vessel to that sailing for the foreign port to which the cargo was consigned, was not such a user of the invention in this country as to constitute an infringement within the jurisdiction of which this Court could take cognizance. It was held by Vice-Chancellor Wood that the defendants had failed to establish such a user of the invention patented by Dobbs as would invalidate the plaintiff's patent by anticipation; and that, having regard to the nature of Mr. Betts's invention, there had been such a user of it in this country as to justify the interference of the Court. The defendants appealed. The Lord Chancellor said that the two principal questions were whether the patent of Mr. Betts was a valid one, and whether the defendants had been guilty of an infringement of it. The patent had been for many years the subject of litigation, particularly in the case of "Betts v. Menzies," and, from the conflicting nature of the evidence, it had become a task of no little difficulty to discover the truth. After a full consideration of the scientific and other evidence, however, he was of opinion that the invention patented by Dobbs was not such a publication of the specification of the plaintiff as to invalidate the patent of the latter, and that there had been no prior user of the plaintiff's invention. The question then arose, whether the defendants had been guilty of infringement. The firm of which the defendant Neilson was manager sold beer for exportation only, and it was insisted, on their part, that as the sale of the beer took place in Scotland, there was no active use of the capsules in England which could constitute an infringement. It did not appear to the Court necessary to consider whether Messrs. Tennant were in possession of the capsuled beer at the time it was in England. The infringement of a patent was a tort, and all persons acting towards it were answerable. The capsules were not used merely for ornament, but for the purpose of excluding air and dampness. The employment of an article for the purpose for which it was designed constituted its active use; and the whole time these capsules were in England they might be said to be in active use for the very object for which they were placed on the bottles by the vendors. It could not be said that there was no user because England was not the final destination of the articles. There had been an active use of the capsules by those who first placed them on the bottles, and by those who had them in their possession afterwards, and, therefore, he (the Lord Chancellor) agreed with the Court below that the defendants had been guilty of an infringement of the patent. With regard to there being a decree for an inquiry as to damages as well as for an account, since the passing of Lord Cairns' Act there was nothing to prevent the Court awarding damages, as well as an account, where full relief could not otherwise be obtained. In the present case, he agreed with the Vice-Chancellor that the plaintiff was entitled to both these means of relief. The decree of the Court below must be affirmed, and the appeal dismissed with costs.

BETTS V. DE VITRE AND OTHERS.

This case also involved the question of the validity of Mr. Betts's patent, the defendants being the Wimshurst Patent Metal Foil and Sheet Metal Company. The Court below held that there had been an infringement of the patent, and granted an injunction to restrain the defendants from manufacturing any material similar to or only colourably differing from the combination of lead and tin invented by Mr. Betts. The Lord Chancellor said that in this case the questions involved were precisely the same as those in the case of "Betts v. Neilson," while the evidence in both was so similar in character that he might refer to the judgment he had just delivered for his decision in the present suit. With regard

to the question of the personal liability of the directors of the Wimshurst Patent Metal Foil and Sheet Metal Company, it had always been held that a master was responsible for all the acts of his servant which were done in the execution of his duty. The alleged infringement took place in the Company's works. It was not sufficient for the directors to order that the work should be so performed as that no injury should be done to any third person; they were bound to take care that their orders were obeyed, and they must be held liable for any violation of those orders, whether open or secret. The decree of the Vice-Chancellor must be affirmed, and the appeal dismissed with costs.

ALLEGED MISREPRESENTATION IN THE SALE OF A BUSINESS.—
DOUBELL v. LOVEHAND.

This case, which came before Mr. Justice Blackburn, at the Court of Queen's Bench, on the 22nd ult., was an action to recover damages for an alleged misrepresentation in the sale of a chemist's and druggist's business.

The plaintiff's case was that he applied to the defendant, who carried on business as a chemist and druggist in Archer-street, Notting-hill, in consequence of his having advertised the sale of the business. Defendant's agent answered by stating that it was a good opening for a surgeon. The fixtures were represented to be worth £350, the stock £150, retail takings £600, and the profits £350. The price asked was £700. The parties met, and eventually plaintiff purchased the business for £600. Plaintiff took possession, when he found the stock did not exceed £25 in value, and that the takings did not amount to anything like the amount represented.

The defence was a total denial of the plaintiff's case, and ultimately a juror was withdrawn.

GOSSIP.

THE Poor-law Board, by a circular in April, 1865, recommended guardians to alter medical contracts as opportunity occurred by excepting from them the supply of cod-liver oil, quinine, and other expensive medicines, and providing these at their own expense in the same way as wine and other extras recommended by the medical officers in the way of nourishment. A Poor-law Board return, dated the 26th of November, states that replies received by the boards of guardians of England and Wales, not including the metropolis, show that in 401 unions the guardians have acted wholly or partially on this recommendation, and that in 225 unions they have not acted upon it.

M. Serres has bequeathed a sum of 60,000 francs to the Academy of Sciences, the interest of which will serve as a prize for the best memoir on a question of Embryogeny; and a further sum of 75,000 francs for augmenting the scientific collection of the museum.

The partnership heretofore subsisting between Messrs. Horrell and Kirkman, Dartford, chemists and druggists, has been dissolved so far as regards T. E. Kirkman.

At Manchester, on the 13th ult., the city coroner held an inquest on the body of Lawrence O'Brien, an old man, who resides in Singleton-street, Butler-street. On Saturday, the deceased got a recommendation to the dispensary, and procured some cough medicine. On taking it home he said that it was nice; the bottle had no label upon it, and on Monday he took one-third of the medicine, which should have lasted him five days. On Tuesday morning his wife, seeing something strange in his appearance, called in her daughter, but they were unable to rouse him from the stupor into which he had fallen, and he never breathed again. They found the bottle empty in his bed, and he must have taken the remainder of the medicine during the night. The jury returned a verdict of died from the effects of an over-dose of narcotic medicine, and also desired to say that there had been neglect in not having the bottle labelled with proper directions.

Mr. Henry Sugden Evans has been elected Vice-President of the Pharmaceutical Society, in the place of Mr. Thomas Hyde Hills, recently elected Treasurer.

On the 5th ult., the sum of £10 was granted from the Benevolent Fund of the Pharmaceutical Society, for the use of the widow of a late member of the Society at Birmingham, and the like amount for the widow of a late member at Sunderland.

GAZETTE.

BANKRUPTS.

BATSFORD, GEORGE, Caledonian-road, brush maker.
CALLARD, THOMAS, Lamb's Conduit-passage, Red Lion-square, shaving-brush maker.
CHECKETTS, BENJAMIN, Codsall Wood, veterinary surgeon.
COTTINGHAM, EDWIN COTTON, Wisbeach, surgeon.
DAVIES, JAMES BATE, Great Bridge, chemist.
EDWARDS, ADAMS, Hartland, chemist.
FARRALL, JOHN HUDSON, Smith, chemist.
FLETCHER, GEORGE, Snelton, druggist.
MILNER, JAMES FORMAN, Cawood, surgeon.
TALLEN, JOHN AXEL, Edward-street, Mile-end Old Town, drug grinder.
WILLIAMS, WILLIAM, Ashbourne, surgeon.

PARTNERSHIPS DISSOLVED.

JOB and ANDREW, Liverpool, chemists.
JONES and EDMUNDS, Newport, Monmouthshire, chemists.
POLLARD and HIGLEY, Halifax, soda-water manufacturers.
PYNE and PYNE, Exeter, brush manufacturers.
SAUL and SAUL, Manchester, drysalter.
SIMONS, LLOYD, and MACFALL, Bristol, druggists.
SUTCLIFFE and GARNER, Bradford, surgeon-dentists.
WILKS and SHEPPARD, Ashford, surgeons.

DECLARATIONS OF DIVIDENDS.

COLTHURST, J., Chew Magna, surgeon, 2s. 2½d.
DOUGHTY, J., Liverpool, chemist, 2s. 9d.
MOREFON, E., Birmingham, drysalter, 3s.
SMITH, H., Eccleshall, chemist, 3d.

SCOTCH SEQUESTRATION.

WIELD, JOHN, Hawick, chemist.

Obituary.

WILLIAM HERAPATH, F.C.S., J.P.

THIS well-known analytical chemist and toxicologist died on the 13th ult., in the seventy-third year of his age. His father was a maltster in Bristol, and after his death Mr. Herapath succeeded to the business. His calling led him to study chemistry, and finding the cultivation of the science a congenial pursuit, he became a diligent worker in the laboratory, and carried out many original investigations. His name is connected with the curious crystalline compound *Herapathite*, or iodoquinine-sulphate, which he discovered. The crystals of this compound possess all the optical properties of tourmalines, and are occasionally substituted for the latter in experiments with polarised light. Mr. Herapath was best known as a toxicologist, and his opinions and experiments are referred to by most writers on medical jurisprudence. According to the *Landet*, the first great trial in which he was engaged was that of Mrs. Burdock for poisoning Mrs. Smith in Bristol, some thirty years ago, when he attracted great attention by the nicety of his analyses, and the discrimination with which he followed up a delicate but conclusive chain of evidence which connected the culprit with the crime of which she was accused. Since then he has been required to make analyses in connection with all the great poisoning *causes célèbres*, and has been opposed to Professor Taylor and others in several instances. In the case of Palmer (the Rugeley poisoner) he was examined for the defence. He was one of the founders of the Chemical Society, and also of the Bristol Medical School, in which he occupied the Chair of Chemistry. He was a liberal politician, and held several municipal appointments in his native town. His son, Dr. W. B. Herapath, F.R.S., is well known as a scientific writer.

SIR DAVID BREWSTER, LL.D., F.R.S.

SIR DAVID BREWSTER died on Monday, the 10th ult., at his country seat of Allerly, near Melrose, at the age of eighty-six years. His father was rector of the Grammar School of Jedburgh, where Sir David was born, on the 11th of December, 1781. Mr. Brewster intended his four sons for the ministry; and three out of four rose high in that profession. The second son, David, chose the study of natural science and philosophy. In 1800 the University of Edinburgh conferred on him the honorary degree of M.A., and here he had the advantage of intercourse with Robinson, Playfair, and Dugald Stewart, who were then Professors. In 1807 he received the degree of LL.D. from the University of Aberdeen, and in the following year he was elected a fellow of the Royal Society of Edinburgh; and in that year, also, he projected and began that most laborious work, the "Edinburgh Encyclopædia," of which he continued editor until its completion in 1830. In 1813 he published some results of his optical studies, in the "Treatise on New Philosophical Instruments," a work which had reference to illumination generally and lighthouses in particular. He also contributed a paper to the Royal Society of London, "On some Properties of Light." The Copley medal was awarded to him by the Society, in 1815, for his paper on the "Polarisation of Light by Reflection," and he was also elected a Fellow. It was in 1816 that Sir David made his name popularly known as the inventor of the kaleidoscope. In 1818 the Rumford medal was given to him by the Royal Society for further discoveries relating to the Polarisation of Light. In 1819, in conjunction with Professor Jameson, he started the *Edinburgh Philosophical Journal*, which he afterwards carried on alone, under the title of the *Edinburgh Journal of Science*, of which sixteen volumes were published, containing many scientific papers from his own pen. He twice had the honour of receiving the Keith medals from the Royal Society of Edinburgh, of which body he was for many years Vice-President. In 1825 he was elected a corresponding member of the Institute of France, and in 1849 he succeeded the illustrious Berzelius as one of its associates. In 1827 he published his "Account of a New System of Illumination for Lighthouses;" and although he offered his services to the lighthouse boards of the United Kingdom, nothing appears to have been done until 1833, when experiments were made in Scotland, which showed that one polyzonal lens, with an argand burner of four concentric circles, gave a light equal to nine parabolic reflectors, each carrying a single argand burner." The great improvement that has been made in lighthouse illumination dates from that period. In 1830, William IV. conferred upon Brewster the honour of the Guelphic Order, and he was knighted in the following year. The last thirty-five years of his life he spent as Principal of the United College of St. Leonard's and St. Salvator at St. Andrew's. In 1859, he was chosen Principal and Vice-Chancellor of Edinburgh University. He was also a magistrate for the county of Roxburgh. His favourite subject was optics in its higher and mathematical departments. It was he who, from his examinations of the solar spectrum, overthrew the assumption that white light is composed of seven colours, and demonstrated that, in reality, it was produced by the combinations of only three. Among the many branches of this intricate science which engaged his attention we may specially mention the optics of crystals, upon which he gave science many valuable memoirs, and atmospheric polarisation, a subject upon which he wrote in the *Edinburgh Philosophical Transactions* a few months

before his death. The discovery of the principle of the stereoscope is due to Wheatstone, but Sir David has the fullest right to the claim, that in his hands—chiefly through the skilful application of semi-lenses—it started into a practical instrument. To his optical researches are due great improvements in our modern microscopes and telescopes; and to his early appreciation of the labours of Fresnel this country is indebted for the introduction into our lighthouses of the dioptric system of illumination and of the polyzonal lens. Among his works may be mentioned his treatise on "New Philosophical Instruments," on "Optics," on the "Kaleidoscope," the "Stereoscope," his "Life of Newton," the "Martyrs of Science," his "Treatise on Natural Magic," and his "More Worlds than One." The latter work was written to oppose the speculations advanced by the late Master of Trinity College, Cambridge, in his "Plurality of Worlds." He was twice married, first in 1810, to Juliet, second daughter of the late James Macpherson, Esq., M.P., of Belleville; and, secondly, in 1857, to Jane Kirk, second daughter of the late Thomas Purnell, Esq., of Scarborough. By the former he has left issue, David Edward, a Lieutenant-Colonel in the Indian Army, who was born in 1815.—*Journal of the Society of Arts.*



THE AMENDED PHARMACY BILL.

TO THE EDITOR OF THE CHEMIST AND DRUGGIST.

SIR,—You favoured me in your last by publishing my statement of the circumstances under which, to advance pharmaceutical legislation another step onwards, I had declared and placed upon record, that "the Pharmacy Bill was so drafted as to deserve the support of the trade."

Allow me, through your columns, to supplement my first communication by a few words on the subsequent action of the United Society, which has judicially and unanimously re-echoed the words of their president.

The members of the London Executive and between thirty and forty delegates representing our important district associations formed a Special General Meeting of the United Society at 18, New Ormond-street, on Thursday, the 5th inst. Addressed to this meeting were forty requisitions on the Bill, voted at meetings held throughout the country; which being read, the Amended Pharmacy Bill was, *ipsissimis verbis*, brought under its final criticism and judgment. As president I beg to thank the associations generally for the support given to the Executive by the presence of their delegates, and the resolutions sent through their presidents and secretaries, to guide us in our decision. I thank Manchester for the resolutions signed by Mr. Slugg, F.R.S.A.; Birmingham, for its resolutions signed by the chairman, Dewsbury, for one signed by thirty-four chemists and druggists in the district; Wakefield, for one signed by all the chemists and druggists in the town; Sheffield, for one signed by sixty-four resident chemists, besides assistants; Bolton, Hull, and the remainder of the forty branches of our Society, for the aid thus given us.

These requisitions so strongly urged the importance of pharmaceutical legislation, and so cordially received the Bill of the Pharmaceutical Society as, in its main provision just, that acting on this general feeling, it was proposed at the outset, seconded, and unanimously carried, that "This Bill be accepted as a basis for legislation, and that

case of any difference of opinion arising between the two Executives, this meeting determines to refer the same to the impartial decision of Parliament."

The confirming of the minutes of the last meeting, after some discussion, was adjourned *sine die*, and we proceeded to take into consideration the clauses of the new Pharmacy Bill, each of which having been critically and exhaustively discussed, the opinion of the meeting was taken on each, and except in some modification of details, to be discussed with the Pharmaceutical Society in accordance with the first resolution, was unanimously agreed to. Mr. Anderson carried his resolution, "That the aforesaid modifications should be matter of conference between the two societies;" and so ended this important meeting, without one word bordering on aught but unanimous good wishes and loyalty to the Bill.

Thus, Sir, a subject regarded by chemists and druggists as of vital importance, and in the settlement of which some justifiable zealous watchfulness has been exercised, is now brought to a practical and honourable issue. The United Society, strong in its organization throughout the country, has to the end sustained its position of watching over and being consulted on the interests of non-pharmaceutists. The members and council of the Pharmaceutical Society, without any personal motives to actuate them, pretending to no special trade privileges, have met us by throwing open to us generously and wisely the advantages their Society has spent twenty years in gaining; and the members of each Society thus congratulate each other on the result, that we are already linked together by ties of goodwill and sympathy ere the Act formally seals our union.

My aim has been, since my election, to be not merely in name, but to act in reality as a thorough working president of the United Society, in view of the important questions to decide, for this reason I made my former communication to you, and for this reason I am indeed proud to announce officially the cheering and unanimous vote, "That the Pharmacy Bill is now beyond general discussion or doubt; that details for arrangement as specified are now confided to the two Executives, and to the impartial consideration of Parliament."

This important resolution of the Executive cannot fail to be most pleasing to you, Mr. Editor, inasmuch as the object you have long had in view is the amalgamation of the two Societies; and I have to thank you personally for the influence your journal has exercised by advocating union. I claim you as a fellow-labourer with me in securing the boon of incorporation. If the efforts have been long and difficult, one gratifying recognition we can ever claim: that of securing for so many thousand chemists, be they pharmaceutical or non-pharmaceutical, these advantages of union.

I close my communication by thanking my brethren in the trade (soon to be a profession) for placing me at the head of the United Society at such a momentous time. It has given me the enviable right of appearing so prominently as their mouth-piece, and of having my name distinguished in our annuals as the leader, in my official capacity, to that position we aspire that our trade should attain.

I remain, yours very truly,

E. P. HORNBY,

President of the United Society of Chemists and Druggists.

THE GRADUATION OF MEDICINE BOTTLES.

TO THE EDITOR OF THE CHEMIST AND DRUGGIST.

SIR,—I have often thought of using your correspondence as the medium of access to our bottle manufacturers in

referring to the careless manner in which the doses are marked. As medical men largely use such bottles, it is very important that the divisions should be uniform, whereas frequently we find the first dose (say of an eight-ounce bottle marked for eight parts) to be one-fourth more in quantity than the last divisions. As errors are generally perceptible in the first and last, surely they might be avoided by some improvement in the mould or the mode of measuring. It is not in the common cheap bottles alone that errors occur, but in bottles of good quality and from good makers. I fear that measures and graduated wine-glasses are equally liable to discrepancies. I have heard of such in some degree, but as yet have not ascertained them for myself, so leave the discussion of them to others. Surely it is not necessary to do more than point out the mischief of incorrect marking, in order to its being corrected. It is also important that phials and bottles generally should be capable of holding their quantity (neither more nor less), whether it be half-ounce or eight ounces or more, which frequently is not the case.

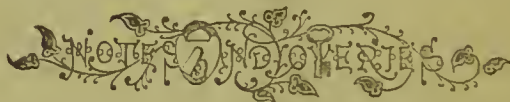
Before I close permit me to say a word as to the Pharmacy Bill. As an outsider, and one desiring a fair measure of equality with my pharmaceutical brethren, I cannot look with complacency on the Bill. It smacks too much of the Tory school, and there seems to me a desire to degrade those who have not had opportunity or inclination to join the Pharmaceutical Society. All clauses bearing such construction must be struck out if unity is desired.

Yours truly,

Eastbourne, March 9.

SAMUEL HALL.

[Our correspondent's remarks on the inaccurate graduation of medicine bottles are deserving of attention. We cannot agree with him in thinking that the Pharmacy Bill indicates a desire to degrade "outsiders," and trust that he will reconsider its provisions without prejudice. We contend that it is a broad and liberal measure.—ED. C. & D.]



F. S. (Chelmsford).—We cannot reproduce formulæ from the Pharmacopœia.

MERCURIAL VAPOUR IN CROUP.—In the *Gazette Médicale*, M. Brégeaud relates a case of croup in which he obtained complete success by the employment of moist mercurial vapour, advocated by M. Abeille. This mode of treatment is intended to soften the false membranes, which are then brought off by the administration of emetics. The remedy is employed in the following manner:—As near as possible to the bed of the patient is placed a small alcohol lamp surmounted by a cup. The receptacle contains two grammes of sulphide of mercury and 250 grammes of an infusion of mallows and poppy-flowers. The mixture must be kept constantly boiling, and must be agitated from time to time; small quantities of the infusion to be added when necessary, and two grammes of the sulphide of mercury every three hours. In the case in question, the atmosphere, says M. Brégeaud, was saturated with moist pungent vapour, which gave a cough to all who drew near. Though the patient was on the verge of asphyxia, M. Brégeaud would not resort to tracheotomy, but kept faith in the remedy.

REFRACTION OF SALTPETRE.—Z. Z. (Northampton).—The oldest method of ascertaining the relative purity of samples of saltpetre is that of Schwarz, which is based upon the appearance of the fractured surface of the melted salt. With pure potassic nitrate the fractured surface is coarsely radiate, but when chlorides are present this structure becomes less distinct, and with $3\frac{1}{2}$ per cent. of sodic chloride

it is perceptible at the edges only. This crude method, which is still adopted in Sweden, is called the "refraction of saltpetre," and the term has been curiously extended to other methods of valuation. The meaning of the commercial phrase "saltpetre of 4.50 per cent. refraction," is simply "saltpetre containing $4\frac{1}{2}$ per cent. of impurities," or in other words "a product containing $95\frac{1}{2}$ per cent. of potassic nitrate." For full details of the various processes adopted for the valuation of crude saltpetre we must refer you to Watts's *Dictionary of Chemistry*, v. iv., p. 101; to Ure's *Dictionary of Arts, Manufactures, and Mines*, v. iii., p. 452; or to special works on chemical analysis, such as those of Fresenius and Nood. The process of Gay-Lussac, which is extensively employed, consists in igniting 1 pt. of the saltpetre with $\frac{1}{2}$ pt. of charcoal, and 1 pts. of common salt to moderate the action. The nitrate is thereby converted into carbonate, the amount of which can be estimated by means of standard sulphuric acid. According to Abel and Bloxam, much more trustworthy results are obtained by substituting for the charcoal Brodie's chemically prepared graphite, which is pure carbon in a state of minute division. The proportions to be used are 20 saltpetre, 5 graphite, and 80 common salt. If the saltpetre contains sulphates, which will be reduced to sulphides by ignition with charcoal, a small quantity of potassic chlorate must be sprinkled on the surface of the mass immediately after its removal from the fire; the sulphites will be thereby completely reconverted into sulphates. The amount of alkali is then determined, as in Gay-Lussac's method, by the burette with standard sulphuric acid.

INDIA-RUBBER SOLUTION—"*Chemicus*" (Walsall).—According to Payen, the best solvent for india-rubber is a mixture of 6 to 8 parts of absolute alcohol, and 100 parts of sulphide of carbon. Benzol is the solvent usually employed for preparing the india-rubber solution used for mounting photographic prints. The lighter portions of a piece of bottle india-rubber should be selected, cut into fine shreds, and placed in a bottle with pure benzol. From 12 to 20 grains of rubber to the ounce of benzol may be used. Rectified coal-tar naphtha is a good solvent, but its smell is rather offensive. Chloroform is a still better solvent, and may be used when cost is not an important object. According to the *Year Book of Photography*, it is a good plan to use a little chloroform to dissolve the rubber, and then dilute with benzol or rectified mineral naphtha. Several of the essential oils, such as the oil of spike, rosemary, or lavender, may be used in the same way for first dissolving the rubber. The solubility of india-rubber varies greatly; but as a rule, new and very elastic samples should be selected. Vulcanised india-rubber is inadmissible.

MILL FOR MERCURIAL OINTMENT—J. R. T. (Risca) writes: "Having the use of a steam-engine adjoining my premises, I should be glad if you would kindly inform me what description of mill would best suit my purpose for making Mercurial Ointment. I should like to know the price of the mill, and the address of the maker, also the quantity of ointment that I could make per day." As the information required can only be afforded by those who have manufactured mercurial ointment on a very large scale, we simply print the query.

PREPARATION OF BROMIDES.—The *Chemical News* prints an abstract of a paper by A. Faust, on a new method of preparing bromides. Bromic sulphide is first formed by mixing together 2 parts of sublimed sulphur and 24 of bromine; this is added to water, in which slaked lime is suspended. A reaction takes place, producing calcic bromide and calcic sulphate. The filtrate is saturated with carbonic acid gas, concentrated and mixed with twice its bulk of alcohol. After a few days, the solution containing pure calcic bromide is filtered off from the calcic sulphate and evaporated. From calcic bromide, any other bromide may be obtained by double decomposition.

VELPEAU'S BLACK CAUSTIC.—Triturate in a porcelian mortar, 30 grammes powdered liquorice root, and add sulphuric acid in small quantities, until a mass of suitable consistence is obtained, which must be neither too hard nor too liquid. This preparation forms a well-marked, hard, black eschar.

ointment for WARTS.—The following formula has been proposed.—

Tako of Galbanum		1 oz.
Pitch		$\frac{1}{2}$ oz.
Lead Plaster		$\frac{1}{4}$ oz.

Melt and add—

Verdigris		} of each 1 oz.
Sal Ammoniac		

This preparation is said to be good for warts and also for corns.

BLUE-BLACK WRITING-INK.—A correspondent communicates to the *Pharmaceutical Journal* the following recipe for a blue-black writing-ink, which, he says, answers very well for a copying-ink:—

Tako of Aleppo Galls, bruised		5½ ounces.
Cloves, bruised		$\frac{1}{2}$ ounce.
Sulphate of Iron		1½ "
Sulphate of Indigo in the form of a slightly acid paste (Sulphindylate of Potash?)		1½ "
Sulphuric Acid		35 minims
Rain Water, cold		40 ounces.

Macerate the galls and cloves in 20 ounces of the water for a week; decant the liquor, and add to the residue of the solid ingredients 10 ounces of the water, with which continue the maceration for four days; then decant as before, and repeat the maceration with the remaining 10 ounces of water for another period of four days. Mix now the whole of the liquors, recovering from the galls all that can be obtained by squeezing them in a cloth, and afterwards filter. To this add first the sulphate of iron, then the sulphuric acid, and lastly the indigo paste. Care must be taken that the indigo does not contain much free acid.

CHILBLAINS.—In reply to the question, What is the predisposing cause of chilblains? Dr. Percy Boulton, in a communication to the *Lancet* writes:—Chilblains are essentially blains produced by a chill, the predisposing cause in every case being a languid circulation. The exciting cause is sudden or premature restoration of heat to a part which has had its vital action diminished by cold. This reaction may be spontaneous, or produced by artificial heat or stimulants. Chilblains usually occur on the extremities, where the heart's power is weakest, and in people who suffer from cold hands and feet. First, the capillary vessels are narrowed, and the blood flows through them quickly. Second, the capillary vessels become dilated, and the blood passes slowly and evenly through them, and the other stages of inflammation rapidly follow.

In the first stage there is usually more or less swelling, redness, and pain or itching, and I find a slight application of solid nitrate of silver sufficient to effect a cure.

In the second stage, serum is effused under the cuticle like a blister; and in the third, the cuticle breaks, and ulceration or even sloughing of the skin may follow. In these stages water dressing and stimulating ointments, especially the red oxide of mercury, are the best dressings.

To avoid chilblains, tight boots and gloves must be abandoned as impeding the circulation. Cloth gloves and woollen socks should be worn in cold weather, and the heart should be assisted by tonics, good nourishing diet, and stimulants—in fact, everything should be done to keep the extremities at an equable temperature.

BLEACHING PALM OIL BY CHROMIC ACID.—The Paris correspondent of the *Chemical News* gives the following detailed account of the process adopted by Engelhardt, of Leipsic, for bleaching palm oil:—A convenient quantity of the palm oil is placed in a cauldron, and heated to about 62° C., and allowed to repose during a whole night; the next day it is poured into a perfectly clean vessel, and cooled down to 40° or 37° C. While this operation is being performed, a certain quantity of water is heated to ebullition—for 1,000 parts by weight of palm oil, 45 parts of water—and in this quantity, 15 parts of bichromate of potash are dissolved. As soon as the solution has cooled a little, 60 parts of hydrochloric acid are added, and it is then mixed with the palm oil, which is vigorously agitated during the mixing. Five minutes suffice for the oil to be coloured green.

By continuing the stirring, the oxide of chromium becomes completely separated; the oil becomes clearer and clearer, and finally quite limpid. When this point is arrived at, it is washed with hot water: the product is perfectly white. If the palm oil has not been thoroughly bleached by the treatment, the process is repeated with 23 parts of bichromate and 1 part of hydrochloric acid. The method is capable of rapid execution, and gives very good results.

VOLUMETRIC DETERMINATION OF ACETIC ACID.—According to a note by G. Merz, translated in the *Chemical News*, the determination of acetic acid, by means of a standard solution of soda, is rendered difficult by the circumstance that sodic acetate imparts a violet tint to litmus, thus obscuring the final change to blue. This inconvenience is obviated by the author by using tincture of turmeric, which remains yellow so long as free acid is present, and turns brown when the point of neutralisation is reached.

ARTIFICIAL WRITING SLATES AND BLACK BOARDS.—We bring before the secretaries of the district Chemists' Associations a simple method of preparing black surfaces for the use of lecturers, as described by Dr. Van der Woyde in a recent number of the *Scientific American*:—"Allow me to communicate the process I prescribed for painting more than 2,000 square feet of blackboard on the plastered walls of the class rooms in the Cooper Institute, New York, when it was organised in 1859, and also several hundred square feet in Girard College, Philadelphia, as it gave perfect satisfaction, and is still used in these institutions. I first have the place of the wall intended to be covered surrounded by a narrow wooden moulding, which may be covered by paint. Japan or varnish is necessary in the black paint, but as varnish makes the board too smooth to write on, I mix a little fine emery in it, to make it slightly gritty, like a slate. Too much emery, or a quality of too coarse a grade, makes the removal of the chalk marks difficult. For the last purpose I take sheepskin with the wool on, nailed on a small piece of board, and always used dry; it is much better than anything else. From time to time, however, the whole blackboard is cleaned with a wet sponge. The best substance for fixing the common lampblack and emery is shellac dissolved in alcohol; the quantities are regulated by the circumstances. In warm weather it requires more alcohol. Too much shellac makes the solution too thick; too little causes it to come off. It is to be put on with a flat brush as rapidly as possible, as it dries at once. The blackboard may be used in less than half an hour after being coated. I never noticed the exact proportions used, but had it mixed, and tested it by putting a little on the wall, and added any of the necessary ingredients till it answered the purpose intended."

Varia.

THE ORIGIN OF HOMŒOPATHY.

SYND AHMAD BAHADOOR has been lecturing on Homœopathy at Benares. The lecturer stated that in the Hindu Shastras the principle of homœopathy, as now laid down, is extant, and has been so from time immemorial; that among the Arabs also the principle is admitted; and that Hahnemann only brought the system to maturity by an uniform observance of the rules.—*British Medical Journal*.

LONDON WATER SUPPLY IN FEBRUARY.

Professor Frankland's analyses of the waters derived from the Thames, and distributed in London for consumption during the month of February are unsatisfactory. With the exception of the West Middlesex, all the companies drawing their supply from the Thames are reported as "delivering imperfectly filtered water on the day when the samples were taken." The water of the Lambeth Company is stated to have been so muddy that brightly illuminated objects could not be seen through a stratum of it twelve inches deep; the Chelsea Company's water seems to have been but little better in that respect, and the supply of both companies "was, on this ground alone, entirely unfit for domestic use." The organic matter contained in all the samples analysed, except those of the West Middlesex and

Southwark Companies, was highly nitrogenised, "and, therefore, probably of animal origin to a considerable extent."

The waters delivered by the New River, East London, and Kent Companies, were clear and transparent, according to the samples taken; but the condition of the water delivered at the Deptford Railway-station by the last-named Company presented remarkable peculiarities. In 100,000 parts of the water was contained the very large amount of 59.2 parts of solid impurity, no less than 14.7 being common salt, "the occurrence of which in such quantity is difficult to account for, except on the supposition that the Company's wells have some connection either with the sea or the brackish reaches of the Thames."—*Lancet*.

BIRDS OF A FEATHER.

Misery makes strange bed-fellows. This has been strikingly illustrated, according to the *New York Medical Journal*, where it is stated that a meeting was held of "allopathics, homœopathics, and eclectics," who, having amicably agreed to discard sectional names and adopt that simply of physicians and surgeons, formed themselves into an association, which, with characteristic modesty, they have styled "The National Medical Association of the United States of America."—*British Medical Journal*.

THE CHOLERA EPIDEMIC OF 1866 IN THE CITY.

In Dr. Letheby's recent Report on the Sanitary Condition of the City of London, the progress of the cholera epidemic of 1866 is reviewed, and many of the facts brought to light during its origin and progress are examined. The duration of the epidemic was six months, the mortality being greatest in the fourth week. The total mortality from cholera in the City during this period was 103, or 9 per 10,000 of the whole population, against 16 per 10,000 in 1854, and 56 in 1849. Considering the proximity of the City to the very focus of the epidemic in the eastern districts, it cannot be doubted. Dr. Letheby thinks, that the low mortality was referable to active sanitary measures employed during the whole period of the epidemic, such as lime-whiting the courts and alleys of the City, disinfecting and cleansing the worst kinds of houses, and supplying carbolic acid to all the water-carts. Dr. Letheby reports that "the alleged pollution of the water rests upon a series of assumptions, many of which are in the highest degree improbable;" and a number of facts have been collected, on the careful examination of which it is found—1. That there is no proof whatever of choleraic pollution of the water; 2. That there was no coincidence of time in the appearance of the disease in the several districts supplied with the suspected water; 3. That numerous districts receiving the same water, but situated at a high level, or placed beyond the cholera-field, were entirely exempt from the disease; 4. That, even in the very heart of the cholera-field, there were places receiving and using the suspected water with impunity; 5. That other places not supplied with the water, but situated within the infected area, suffered equally with the neighbourhood.—*British Medical Journal*.

INSURING INFANTS' LIVES.

The disclosures which have been made respecting the suspicious deaths of infants whose lives have been insured, have elicited the following question in the columns of *Public Health*:—"Considering the high rate of mortality amongst infants which are entered upon the books of clubs, under the pretext of 'insuring their lives,' would it not be more accurate to describe the practice as 'insuring their deaths?'"

UNSAFE PETROLEUM.

It would be well if all wholesale dealers in either shale oil or American petroleum would be a little more particular as to the firing point. If each wholesale dealer were to fix upon a safe limit, and carefully avoid selling any oil which gave off inflammable vapour at a lower temperature, the progress of the trade would not be interfered with by so many alarming reports and accidents; whilst if every wholesale dealer sold under a distinct brand, the fraudulent and murderous practice of mixing cheap spirits with safe oil could easily be traced to the offender. In the case of a death, caused some time ago by the explosion of a mineral oil lamp, we, with no little trouble, traced the circumstance that the retailer who sold the oil—a small shopkeeper in a low neighbourhood—had purchased a good safe oil and mixed with it a large propor-

tion of petroleum spirit. At the inquest, the evidence of this very man was accepted as proof of the safety of his oil. Had some practical and intelligent non-juryman been engaged to trace the oil that caused the death, to the merchant as we traced it, and then to test it in comparison with the bulk from which it was sold, a charge of manslaughter against the retailer would have been the result. Had we, after a verdict of "Accidental Death," published the evidence collected at our private inquest, a verdict of "Wilful Damage" would probably have been our reward.—*The Oil Trade Review*.

AMALGAMATION OF THE MEDICAL SCHOOLS IN BIRMINGHAM.

At a meeting of the Committee held March 4 at Sydenham College, the arrangements for amalgamation were laid before the Council, and great satisfaction was expressed by several members of the Council at the union of the two schools. A vote of thanks was passed to the Committee by the Council of the College for the trouble they had taken and for the satisfactory result they had attained. The necessary legal forms for the dissolution of Sydenham College are being gone through, and then the union of that school with Queen's College will be concluded legally, as it is now virtually.—*British Medical Journal*.

CIDER DOCTORED WITH SULPHITE OF LIME.

Formerly sour wine and cider was occasionally corrected by sugar of lead. As, however, the injurious effect of this substance is pretty generally known, and many are on their guard against it, it is seldom used at present, but the acid fermentation is prevented by the addition of sulphite of lime during or before fermentation; this being an unstable compound, the sulphurous acid SO_2 (absorbing readily the oxygen which enters the barrel, and otherwise would make the cider very acid) is changed into sulphuric SO_3 , and the sulphite of lime into the sulphate of lime or gypsum. Such cider becomes soon clear and transparent, and has a good taste. It, however, does not agree with many persons: they complain, even the most healthy, of heaviness in the stomach, loss of appetite, etc. The cause is the presence of this newly-formed gypsum in solution, which is a very indigestible substance, and the presence of which is easily demonstrated by analysis, in surprisingly large quantity.—*DR. VANDER WEYDE in Med. and Surg. Reporter (Philadelphia)*.

POISONING BY PAPER COLLARS.

One of the physicians at a meeting in Tarentum, Alleghany county, Pa., reported recently a case of poisoning of a child, who had eaten the greater part of a paper collar which had been thrown away; a gentle emetic and some other remedies serving to remove the poison, caused the symptoms to subside, in not less, however, than about forty hours. When these collars are chemically examined, some are found to be covered with zinc-white (oxide of zinc), and others with powdered heavy spar (sulphate of baryta). Both substances are more or less poisonous; the zinc preparations, however, by their emetic properties, are their own antidotes; and when we are certain that we have to do with nothing else, an emetic is unnecessary, and warm water, with some butter to promote the vomiting, is all that is required. The preparations of barium, however, are mostly poisonous, and never cause vomiting, except in large doses, when also convulsions and other alarming symptoms appear. For these, emetics and the stomach-pump are to be recommended. The wearing of these paper collars has also produced, in some individuals, eruptions around the neck, where the perspiration partially dissolved the white paint, and caused it to enter the pores of the skin. Knowing what some of these collars are covered with, this is not to be wondered at.—*DR. VANDER WEYDE in Med. and Surg. Reporter (Philadelphia)*.

THE EMPLOYMENT OF UNQUALIFIED ASSISTANTS.

With reference to the severe strictures upon the employment of unqualified assistants which have appeared in the *Daily Telegraph*, in reference to the neglect of a strangulated hernia in the case of Mrs. Liddle at Poplar, a correspondent points out that the Poor-law Board in no way recognises the employment of an assistant by a Poor-law medical officer in the performance of his work. "The appointed medical

officer, and he alone, is responsible for the attendance. It is not possible for the Poor-law Board to prevent absolutely the employment by their medical officers of assistants, whether qualified or unqualified. All that the Poor-law Board can do is to throw the whole responsibility of the treatment upon the medical officer. The orders of the Board on this point are very distinct. 'Every officer shall perform his duty in person, and shall not entrust the same to a deputy, except with the special permission of the commissioners,' etc. 'Every medical officer shall be bound to visit and attend personally, as far as may be practicable, the poor persons entrusted to his care.' More than this the Poor-law Board could not properly do. It would be a very hard thing if a pupil could not call to learn if a patient had had his bowels open, or even to administer a clyster. If the non-employment of unqualified assistants were made absolute, what would become of the instruction of medical students in midwifery and hospital practice? It is evident, for obvious reasons, that no power could enforce such an obligation on medical men."—Another correspondent of great information on this subject writes: "I beg of you to ventilate thoroughly the question raised in the *Daily Telegraph* by the letter of a hospital surgeon. It touches the whole question of poor-relief, and affects the constitution of medical practice. Is the employment of paid unqualified assistants justifiable on any ground or in any kind of practice? Is it not legitimatising illegal practice? Our Medical Act aims at producing a high standard of medical skill and education. The system of employing unqualified medical assistants is clearly in most dangerous opposition to that principle. Here is a subject for the Medical Council and for the British Medical Association. Let our leading general practitioners speak their minds in the Journal."—*Brit. Med. Journal*.

ABSORPTION OF GASES BY MELTED COPPER.

Caron has found that melted copper absorbs hydrogen, carbonic oxide, ammonia, and carburetted hydrogen, and liberates them again on cooling, their evolution being attended with the phenomenon of "spitting," as observed in the case of silver which has taken up oxygen, whilst the solidified metal becomes porous. This absorption he found to take place only when the copper is fused in crucibles of glazed porcelain, and failed to observe any such change on using vessels of lime, cake, or biscuit porcelain ware. In like manner antimony absorbed hydrogen, though it appears that neither melted silver nor tin takes up this gas.—*Engineer*.

ERRATUM.—In our last the title of Dr. Attfield's book, p. 98, was printed as an Introduction to *Practical Chemistry* instead of *Pharmaceutical Chemistry*.



CHEMICALS.

SINCE the publication of our February report, the prices obtained for the more important chemical products have fluctuated in a noteworthy manner. In the second week of February, the demand for SODA CRYSTALS was very dull, and sales were reported at £4 7s. 6d. per ton ex ship. In the third week, the London market opened at £4 7s. 6d., and closed at £4 12s. 6d. ex ship—the improvement being owing to increased shipments from Newcastle to the Continent on old contracts, and the consequent diminution in the supplies to the over-stocked London market. In the fourth week, a further improvement took place, and at its close £4 15s. was asked. There has been no falling-off in prices since the present quotations, being £4 15s. to £4 17s. 6d. The demand for SODA ASH is good, and 2½d. per degree has been demanded. CAUSTIC SODA is in fair demand, but the sales of BICARBONATE have been simply on a retail scale. A good

Monthly Price Current.

[The prices quoted in the following list are those actually obtained in Mining and for articles sold in bulk. Our Retail Subscribers must not expect to purchase at these market prices, but they may draw from them useful conclusions respecting the prices at which articles are offered by the Wholesale Firms.]

CHEMICALS.

	1868. March.		1867. March.	
ACIDS—	s. d.	s. d.	s. d.	s. d.
Acetic per lb.	0 4	0 0	0 4	0 0
Arsenious (see Arsenic)				
Citric per lb.	1 10	0 0	2 0	2 0
Nitric "	0 5	0 5½	0 5	0 5½
Oxalic "	0 8	0 8½	0 10½	0 0
Sulphuric "	0 0½	0 1	0 0½	0 1
Tartaric crystal ..	1 1	1 1½	1 3½	1 3½
powdered ..	1 1½	1 1½	1 3½	0 0
ANTIMONY, ore..... per ton	260 0	0 0	190 0	200 0
crude .. per cwt	23 0	0 0	23 0	24 0
regulus.. "	44 0	45 0	34 0	34 0
star .. "	44 0	45 0	34 0	34 6
ARSENIC, lump.....	16 0	16 6	15 6	0 0
powder..... "	7 3	7 6	7 3	0 0
ASHES (see Salts)				
BRIMSTONE, rough .. per ton	130 0	132 6	132 6	135 0
roll per cwt	10 3	10 6	10 3	0 0
flour..... "	14 0	14 6	12 6	0 0
IODINE, dry per oz.	0 9	0 9½	0 9½	0 9½
IVORY BLACK, dry.. per cwt.	0 0	0 0	8 0	0 0
MAGNESIA, calcined.. per lb.	1 6	1 3	1 6	1 3
MERCURY per bottle	137 0	0 0	137 6	0 0
MINIUM, red per cwt.	21 0	0 0	21 6	22 6
orange .. "	33 6	0 0	33 6	0 0
PRECIPITATE, red .. per lb.	2 0	0 0	2 6	0 0
white .. "	2 5	0 0	2 5	0 0
PRUSSIAN BLUE "	1 0	1 10	1 0	1 10
SALTS—				
Alum per ton	150 0	155 0	150 0	155 0
powder "	170 0	175 0	170 0	175 0
Ammonia:				
Carbonate per lb.	0 5	0 5½	0 5	0 5½
Hydrochlorate, crude,				
white..... per ton	400 0	500 0	400 0	500 0
British (see Sal Ammoniac)				
Muriate (see Hydrochlorate)				
Sulphate per ton	280 0	290 0	224 0	225 0
Argol, Cape per cwt	65 0	75 0	72 6	90 0
France .. "	48 0	70 0	56 0	76 0
Oporto, red .. "	25 0	28 0	30 0	32 0
Sicily .. "	50 0	55 0	65 0	70 0
Naples, white .. "	60 0	70 0	66 0	71 0
Florence, white .. "	75 0	80 0	85 0	90 0
" red .. "	05 0	70 0	77 0	80 0
Bologna, white .. "	78 0	80 0	87 0	90 0
Ashes (see Potash and Soda)				
Bleaching powd.. per cwt.	12 0	12 6	14 6	15 0
Borax, crude .. "	35 0	50 0	40 0	62 0
(Tincal) .. "	40 0	52 6	40 0	60 0
British refnd.. "	50 0	52 6	70 0	0 0
Calomel per lb.	2 5	0 0	2 5	0 0
Copper:				
Sulphate per cwt.	24 0	25 0	25 0	26 0
Copperas, green .. per ton	55 0	60 0	57 6	60 0
Corrosive Sublimate .. p. lb.	1 11	0 0	1 10	0 0
Cr. Tartar, French, p. cwt.	79 0	80 0	80 0	82 6
grey .. "	55 0	70 0	72 0	77 6
brown .. "	55 0	60 0	68 0	72 6
Epsom Salts per cwt.	8 6	8 6	8 6	9 0
Glauber Salts "	5 6	6 0	5 6	0 0
Lime:				
Acetate, white, per cwt.	13 0	21 6	10 0	18 0
Magnesia:				
Carbonate..... "	42 6	0 0	42 6	45 0
Potash:				
Bichromate per lb.	0 5	0 0	0 5	0 5½
Carbonate:				
Potashes, Canada, 1st				
sort per cwt.	33 6	0 0	37 0	0 0
Pearlashes, Canada, 1st				
sort per cwt.	34 0	35 0	43 0	0 0
Chlorate per lb.	0 11½	1 0	1 0	1 0½
Hydriodate (see Potassium, Iodide)				
Muriate (see Potassium, Chloride)				
Prussiate per lb.	1 0	1 1	1 1	0 0
red .. "	1 9½	1 10	1 9½	1 10
Tartrate (see Argol and Cream of Tartar)				
Potassium:				
Chloride per cwt.	8 3	8 6	8 0	8 0
Iodide per lb.	11 0	11 9	13 0	0 0
Quinine:				
Sulphate, British, in				
bottles per oz.	4 3	4 6	5 0	0 0
Sulphate, French .. "	4 0	0 0	4 6	4 8
Sal Acetos per lb.	0 10½	0 0	1 0½	1 1
Sal Ammoniac, Brit. cwt.	23 6	34 6	35 0	37 0
Saltpetre:				
Bengal, 0 per cent. or				
under per cwt.	19 3	19 6	19 0	19 6
Bengal, over 0 per cent.				
per cwt.	18 9	19 0	18 0	18 9
Madras, ...	18 0	19 0	17 0	18 0

	1868.		1867.	
	s. d.	s. d.	s. d.	s. d.
Saltpetre, continued:—				
Bomb & Kurrachee p. ct.	15 6	19 0	14 0	16 6
European..... "	21 0	22 0	20 0	0 0
British, refined .. "	22 9	23 3	23 0	23 6
Soda:				
Bicarbonate..... "	12 9	13 0	22 0	0 0
Carbonate:				
Soda Ash..... per deg.	0 2	0 2½	0 2½	0 2½
Soda Crystals per ton.	92 6	95 0	115 0	117 6
Hyposulphite .. per cwt.	22 0	0 0	18 0	0 0
Nitrate	11 0	12 6	11 0	13 0
SUGAR OF LEAD, White, cwt.	37 0	37 6	37 6	38 0
Brown	23 0	29 0	29 0	30 0
SULPHUR (see Brimstone)				
VERDIGRIS per lb.	0 11	1 0	0 11	1 0
VERMILION, English.. per lb.	2 9	3 1	2 9	3 2
China..... "	2 9	3 0	2 7	2 8
DRUGS.				
ALOES, Hepatic..... per cwt.	90 0	180 0	80 0	180 0
Socotrine .. "	180 0	340 0	180 0	300 0
Cape, good.. "	30 0	32 0	31 0	33 0
Inferior .. "	18 0	29 0	20 0	30 0
Barbadoes .. "	75 0	220 3	60 0	300 0
AMBERGRIS, grey per oz.	32 0	35 0	35 0	0 0
BALSAMS—				
Canada per lb.	1 5	0 0	1 2	1 3
Capivi	1 8½	1 9½	1 10½	1 11
Peru	8 0	8 6	5 9	0 0
Tolu	2 6	2 7	2 6	2 9
BARKS—				
Canela alba per cwt.	22 0	27 0	25 0	40 0
Cascarilla	25 0	35 0	20 0	29 0
Peru, crown & grey per lb.	1 0	2 0	1 2	2 3
Calisaya, flat .. "	2 6	2 8	2 6	2 11
quill .. "	2 3	2 5	2 2	2 7
Cartagena .. "	0 9	1 3	1 0	1 6
Pitaye	1 0	1 3	0 9	2 0
Red	2 6	10 0	2 6	12 0
Buco Leaves	0 2½	0 9	0 4	0 11
CAMPHOR, China.. per cwt.	142 6	0 0	140 0	0 0
Japan	142 6	0 0	145 0	0 0
Refin Eng. per lb.	1 10½	0 0	1 9½	1 10
CANTHARIDES	2 0	2 1	2 2	2 5
CHAMOMILE FLOWERS p. cwt.	45 0	80 0	50 0	120 0
CASTOREUM per lb.	5 0	32 0	1 0	20 0
DRAGON'S BLOOD, reed p. ct.	190 0	220 0	200 0	280 0
lump .. "	100 0	240 0	90 0	280 0
FRUITS AND SEEDS (see also Seeds and Spices)				
Anise, China Star pr cwt.	120 0	0 0	115 0	120 0
German, &c. .. "	23 0	40 0	23 0	44 0
Beans, Tonquin .. per lb.	1 0	1 6	1 0	1 10
Cardamoms, Malabar				
good .. "	7 6	8 6	6 0	6 4
inferior .. "	5 3	7 3	4 0	5 9
Madras .. "	4 6	7 9	3 9	5 6
Ceylon .. "	3 0	3 3	2 9	3 9
Corozo Nuts..... per cwt.	10 0	18 0	9 0	15 0
Cassia Fistula.. "	20 0	32 0	15 0	34 0
Castor Seeds .. "	10 0	12 0	10 0	12 0
Cocculus ludicus .. "	25 0	30 0	25 0	30 0
Colocyth, apple.. per lb.	0 6½	0 10	0 7	0 11
Croton Seeds .. per cwt.	97 6	115 0	120 0	140 0
Cubeba	42 6	45 0	51 0	52 0
Cumin	16 0	20 0	16 0	20 0
Dividivi	11 0	13 0	12 0	13 6
Fenugreek..... "	11 0	12 0	10 0	0 0
Guinea Graius .. "	44 0	46 0	55 0	57 0
Juniper Berries .. "	9 0	10 0	8 6	10 0
Myrobalans .. "	13 0	17 6	11 0	16 6
Nux Vomica..... "	16 0	19 0	8 0	10 6
Tamarinds, East India				
West India .. "	22 0	32 0	25 0	26 0
Vanilla, large per lb.	9 0	14 0	7 0	14 0
inferior .. "	4 0	8 0	4 0	12 0
Wormseed .. per cwt.	1 6	0 0	5 6	6 0
GINGER, Preserved, in bond				
(duty 1d. per lb.) per lb.	0 9	0 10½	1 0	1 2
GUMS (see separate list)				
HONEY, Narbouee				
Cuba	0 0	0 0	50 0	70 0
Jamaica .. "	25 0	38 0	26 0	41 0
IPECACUANHA .. "	22 0	43 0	23 0	55 0
LSINGLASS, Brazil.. "	7 6	7 8	9 3	9 6
Tongue sort .. "	2 3	3 10	2 0	3 10
East India .. "	2 10	4 0	2 6	4 4
West India .. "	2 0	4 0	1 10	4 2
Russ. long staple .. "	3 7	4 0	3 9	4 0
" leaf .. "	9 0	10 0	9 6	10 6
" Simovia .. "	0 0	8 9	7 0	10 0
JALAP, good	1 6	2 6	1 9	2 6
infer. & stems .. "	4 3	5 0	4 8	5 6
LEMON JUICE .. per degree	0 0½	0 0½	0 0½	0 0½
LIQUEUR, Spanish per cwt.	65 0	70 0	65 0	75 0
Italian .. "	50 0	60 0	50 0	70 0
MANNA, flaky	4 0	0 0	3 6	4 6
small..... per lb.	1 10	0 0	1 10	2 0
MUSK..... per oz.	21 0	40 0	19 0	33 0
OILS (see also separate List)				
Almond, expressed per lb.	1 10	0 0	1 9	0 0
Castor, 1st pale .. "	0 6½	0 7	0 6½	0 6½
second .. "	0 6	0 6½	0 6	0 6½
infer. & dark .. "	0 5½	0 5½	0 5½	0 6
Bombay (in casks) .. "	0 0	0 0	0 5½	0 0
Ced Liver per gall.	4 6	5 6	4 3	8 0
Croton..... per oz.	1 2	1 0	1 2	1 6
Essential Oils:				
Almond per lb.	40 0	0 0	36 0	0 0

1868.				1867.				1868.				1867.			
	s.	d.		s.	d.				s.	d.		s.	d.		
Essential Oils, continued:—															
Anise-seed per lb.	10	0	to 10	0	0	10	0	to 11	0	0	10	0	to 11	0	0
Bay per cwt.	80	0	..	90	0	80	0	..	90	0	80	0	..	90	0
Bergamot per lb.	7	6	..	16	0	12	0	..	18	0	12	0	..	18	0
Cajuput, (in bond) per oz.	0	13	..	0	2	0	2	..	0	23	0	2	..	0	23
Caraway per lb.	5	0	..	0	0	5	0	..	0	0	5	0	..	0	0
Cassia per lb.	6	3	..	0	0	7	0	..	3	6	6	0	..	3	6
Cinnamon per oz.	1	3	..	3	0	0	4	..	0	0	0	4	..	0	0
Cinnamon-leaf per lb.	0	5	..	0	7	0	23	..	0	33	0	23	..	0	33
Citronelle per lb.	0	23	..	0	0	0	43	..	0	0	0	43	..	0	0
fine per lb.	0	33	..	0	0	2	7	..	0	0	1	0	..	0	0
Clove per lb.	2	6	..	0	0	1	0	..	1	9	2	0	..	1	9
Juniper per lb.	2	0	..	3	9	2	9	..	4	0	2	9	..	4	0
Lavender per lb.	4	0	..	7	6	0	0	..	10	03	0	0	..	10	03
Lemon per lb.	0	6	..	0	63	0	9	..	0	0	0	9	..	0	0
Lemongrass per oz.	3	6	..	4	6	3	6	..	4	6	3	6	..	4	6
Neroli per lb.	0	3	..	0	0	0	6	..	0	11	0	6	..	0	11
Nutmeg per lb.	5	0	..	7	0	5	0	..	7	0	5	0	..	7	0
Orange per lb.	16	0	..	20	0	17	0	..	21	0	17	0	..	21	0
Otto of Roses per oz.	21	0	..	22	0	21	6	..	22	0	21	6	..	22	0
Peppermint:															
American per lb.	35	0	..	43	0	33	0	..	35	0	33	0	..	35	0
English per lb.	1	9	..	2	0	1	0	..	2	0	1	0	..	2	0
Rosemary per lb.	3	0	..	3	3	18	0	..	30	0	18	0	..	30	0
Sassafras per lb.	16	0	..	25	0	2	0	..	3	0	2	0	..	3	0
Spearmint per lb.	1	10	..	4	0	0	6	..	0	9	0	6	..	0	9
Thyme per lb.	0	23	..	0	23	13	6	..	17	9	13	6	..	17	9
Mace, expressed .. per oz.	19	0	..	19	6	3	6	..	7	0	3	6	..	7	0
Opium, Turkey per lb.	3	0	..	7	0	100	0	..	110	0	100	0	..	110	0
Egyptian per lb.	100	0	..	105	0	100	0	..	110	0	100	0	..	110	0
Quassia (bitter wood) per ton	7	0	..	10	9	6	0	..	10	9	6	0	..	10	9
Rhubarb, China, good and fine	1	6	..	6	6	1	8	..	5	6	1	8	..	5	6
Good, mid. to ord. "	10	0	..	12	0	9	6	..	10	0	9	6	..	10	0
Dutch trimmed "	9	0	..	10	0	9	0	..	10	0	9	0	..	10	0
Russian per lb.	9	0	..	10	0	9	0	..	10	0	9	0	..	10	0
ROOTS—															
Calumba per cwt.	17	0	..	32	0	49	0	..	45	0	49	0	..	45	0
China per cwt.	30	0	..	0	0	25	0	..	33	0	25	0	..	33	0
Galangal per lb.	16	0	..	18	0	12	0	..	0	0	12	0	..	0	0
Gentian per lb.	16	0	..	17	0	16	0	..	17	0	16	0	..	17	0
Hellebore per lb.	0	0	..	0	0	26	0	..	32	0	26	0	..	32	0
Orris per lb.	36	0	..	40	0	34	0	..	35	0	34	0	..	35	0
Pellitory per lb.	58	0	..	60	0	60	0	..	0	0	60	0	..	0	0
Pink per lb.	0	9	..	0	11	3	6	..	4	0	3	6	..	4	0
Rhatany per lb.	0	6	..	0	10	0	7	..	1	0	0	7	..	1	0
Sceneca per lb.	1	5	..	0	0	2	6	..	0	0	2	6	..	0	0
Snake per lb.	2	0	..	2	6	4	0	..	0	0	4	0	..	0	0
Saffron, Spanish per cwt.	29	6	..	33	0	36	0	..	38	0	36	0	..	38	0
SALEP per cwt.	110	0	..	0	0	110	0	..	120	0	110	0	..	120	0
SARSAPARILLA, Lima per lb.	0	0	..	0	0	1	0	..	1	4	1	0	..	1	4
Part per lb.	0	10	..	1	4	0	11	..	1	1	0	11	..	1	1
Honduras per lb.	1	0	..	2	1	1	0	..	2	0	1	0	..	2	0
Jamaica per lb.	1	0	..	0	0	8	0	..	0	0	8	0	..	0	0
SASSAFRAS per cwt.	10	0	..	36	0	30	0	..	43	0	30	0	..	43	0
SCAMMONY, Virgin per lb.	28	0	..	23	0	12	0	..	23	0	12	0	..	23	0
second & ordinary per lb.	11	0	..	23	0	0	4	..	0	43	0	4	..	0	43
SENNA, Bombay per lb.	0	23	..	0	4	0	3	..	0	93	0	3	..	0	93
Tinivelly per lb.	0	2	..	0	9	0	5	..	0	10	0	5	..	0	10
Alexandria per lb.	0	5	..	0	10	1	2	..	0	0	1	2	..	0	0
Spermackit, refined per lb.	1	6	..	0	0	1	1	..	0	0	1	1	..	0	0
AMERICAN per lb.	1	5	..	0	0	0	23	..	0	33	0	23	..	0	33
SQUILL per lb.	0	1	..	0	2	0	23	..	0	33	0	23	..	0	33
GUMS.															
AMMONIAC, drop .. per cwt.	180	0	..	220	0	180	0	..	200	0	180	0	..	200	0
lump per cwt.	120	0	..	160	0	100	0	..	160	0	100	0	..	160	0
ANIMI, fine washed per cwt.	210	0	..	230	0	210	0	..	230	0	210	0	..	230	0
boldscraped per cwt.	190	0	..	215	0	190	0	..	200	0	190	0	..	200	0
sorted per cwt.	109	0	..	180	0	100	0	..	190	0	100	0	..	190	0
dark per cwt.	70	0	..	100	0	80	0	..	105	0	80	0	..	105	0
ARABIC, E. I., fine per cwt.	83	0	..	85	0	105	0	..	115	0	105	0	..	115	0
pale picked per cwt.	72	0	..	82	0	90	0	..	100	0	90	0	..	100	0
arts, gd. to fin. per cwt.	45	0	..	03	0	72	0	..	85	0	72	0	..	85	0
garblings per cwt.	170	0	..	210	0	195	0	..	230	0	195	0	..	230	0
TURKEY, pick. gd to fin. per cwt.	85	0	..	160	0	100	0	..	170	0	100	0	..	170	0
second & inf. per cwt.	65	0	..	80	0	80	0	..	95	0	80	0	..	95	0
in sorts per cwt.	27	0	..	40	0	64	0	..	66	0	64	0	..	66	0
Gedda per cwt.	70	0	..	75	0	90	0	..	92	0	90	0	..	92	0
BARBARY, white per cwt.	68	0	..	75	0	89	0	..	91	0	89	0	..	91	0
brown per cwt.	95	0	..	53	0	70	0	..	74	0	70	0	..	74	0
AUSTRALIAN per cwt.	55	0	..	90	0	35	0	..	95	0	35	0	..	95	0
ASSAFETIDA, com. to gd. per cwt.	520	0	..	660	0	540	0	..	720	0	540	0	..	720	0
BENJAMIN, 1st qual. per cwt.	350	0	..	560	0	260	0	..	520	0	260	0	..	520	0
2nd per cwt.	110	0	..	360	0	80	0	..	320	0	80	0	..	320	0
3rd per cwt.	00	0	..	70	0	70	0	..	77	0	70	0	..	77	0
COPAL, Angola, rod per cwt.	70	0	..	84	0	65	0	..	80	0	65	0	..	80	0
Benguela per cwt.	0	7	..	1	3	0	5	..	1	0	0	5	..	1	0
Sierra Leone per lb.	27	0	..	46	0	22	6	..	45	0	22	6	..	45	0
Manilla per cwt.	80	0	..	87	0	75	0	..	84	0	75	0	..	84	0
DAMMAR, pale per cwt.	13	0	..	19	0	20	0	..	22	0	20	0	..	22	0
EUPHORIUM per cwt.	240	0	..	280	0	240	0	..	280	0	240	0	..	280	0
GALBANUM per cwt.	700	0	..	750	0	660	0	..	800	0	660	0	..	800	0
GAMBOGE, pickd pipe per cwt.	600	0	..	610	0	400	0	..	600	0	400	0	..	600	0
in sorts per cwt.	0	6	..	2	0	0	8	..	1	10	0	8	..	1	10
GUAIACUM per lb.	100	0	..	150	0	300	0	..	400	0	300	0	..	400	0
KINO per cwt.	35	0	..	40	0	27	0	..	26	0	27	0	..	26	0
KOWRIE, rough per cwt.	42	6	..	75	0	40	0	..	79	0	40	0	..	79	0
scraped per cwt.	5	0	..	5	6	7	0	..	7	6	7	0	..	7	6
MASTIC, pickd per lb.	160	0	..	200	0	150	0	..	180	0	150	0	..	180	0
MYRRH, gd. & fine per cwt.	100	0	..	100	0	80	0	..	140	0	80	0	..	140	0
sorts per cwt.	82	0	..	85	0	70	0	..	77	0	70	0	..	77	0
OLIBANUM, p. sorts per cwt.	70	0	..	80	0	00	0	..	67	6	00	0	..	67	6
amber & ylw. per cwt.	27	0	..	45	0	22	0	..	42	0	22	0	..	42	0
garblings per cwt.	80	0	..	90	0	105	0	..	113	0	105	0	..	113	0
SENECAL per cwt.	75	0	..	190	0	80	0	..	197	0	80	0	..	197	0
SANDARAC per cwt.	75	0	..	190	0	80	0	..	197	0	80	0	..	197	0
Grains, continued:—															
THUS per lb.	12	0	to 10	0	0	12	0	to 10	0	0	12	0	to 10	0	0
THAGACANTH, leaf															